

Ham Nugets by OH3NFC  
PTT Control of VoIP Applications  
Version 1.1

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June 11, 2018

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## 1 Introduction

Linking amateur radio RF-frequencies using Voice over IP-protocol (VoIP) or Radio over IP-protocol (RoIP) applications is getting popular. There are various applications available for the desktop computers and the smart phone platforms. I'm using EchoLink, TeamSpeak, Zello and BlueDV.

This Ham Nuggets document by the amateur radio station OH3NFC describes how the TX/RX-control is built without using any voice activated transmission in the 4-in-1 crosslink node running in a single Windows 10 computer. The only additional piece of the hardware is the ThumbDV (AMBE-3000) USB-dongle for encoding and decoding the digital voice.

This document is written using L<sup>A</sup>T<sub>E</sub>X document preparation system<sup>1</sup> in a Linux computer.

The most recent version of this document is available at <http://arpotechno.fi/files/ptt-control.pdf>

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<sup>1</sup>LaTeX, which is pronounced «Lah-tech» or «Lay-tech» (to rhyme with «blech» or «Bertolt Brecht»), is a document preparation system for high-quality typesetting. It is most often used for medium-to-large technical or scientific documents but it can be used for almost any form of publishing. See more at <https://www.latex-project.org/>

## 2 RX/TX Control of VoIP Applications

The 4-in-1 crosslink node is running in a single Windows 10 computer. The applications are:

1. **BlueDV for Windows** <http://www.pa7lim.nl/bluedv-windows/>
2. **EchoLink** <http://www.echolink.org/>
3. **TeamSpeak3 Client** <https://www.teamspeak.com/en/>
4. **TS-Gateway Commander** <https://www.funkerportal.de/>
5. **Zello** <https://zello.com/>
6. **com0com** <https://sourceforge.net/projects/com0com/files/com0com/>
7. **hub4com** <https://sourceforge.net/projects/com0com/files/hub4com/>
8. **Virtual Audio Cable** <https://www.vb-audio.com/Cable/>
9. **Digital Level Meter** <http://www.darkwooddesigns.co.uk/pc2/meters.html#Digital>

BlueDV for Windows is connected to a BrandMeister<sup>2</sup> server and is cross-linking the audio to the talk group 24497. ThumbDV (AMBE-3000) USB-dongle attached to an USB port of the Windows computer is used for encoding and decoding the digital voice used in the DMR communication.

EchoLink application is running in the *sysop* mode using the call sign OH3NFC-R and is cross-linking the audio to the connected EchoLink stations.

TeamSpeak3 Client utilizing TS-Gateway Commander is connected to the TS3 server at *dv.oh3nfc.dy.fi* and cross-links audio to the channel Crosslink (RoIP).

Zello is running in the *gateway* mode and is cross-linking the audio to the channel OH3NFC CROSSLINK

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<sup>2</sup>BrandMaster/BrandMeister is an operating software for Master servers participating in a worldwide infrastructure network of amateur radio digital voice systems. See more at [https://wiki.brandmeister.network/index.php/What\\_is\\_BrandMeister](https://wiki.brandmeister.network/index.php/What_is_BrandMeister)

com0com and hub4com are used for the PTT-control of the VoIP applications. The PTT-control uses CTS and RTS pins of the four virtual com-port pairs. Each VoIP application has own com-port which counter part is connected to the hub4com application.

Virtual Audio Cable (VAC) connects all the input and output audio streams of the VoIP applications, only one channel is in use.

Digital Level Meter monitors the audio levels and peaks. It helps setting the correct input and output audio settings of the VoIP applications.

**Virtual com-port pairs** Every one of the VoIP applications have own virtual COM-port for the RX/TX control. Picture 1 shows the setup of the virtual COM-port pairs. The option *use Port Class* is checked for the COM-ports on the left.

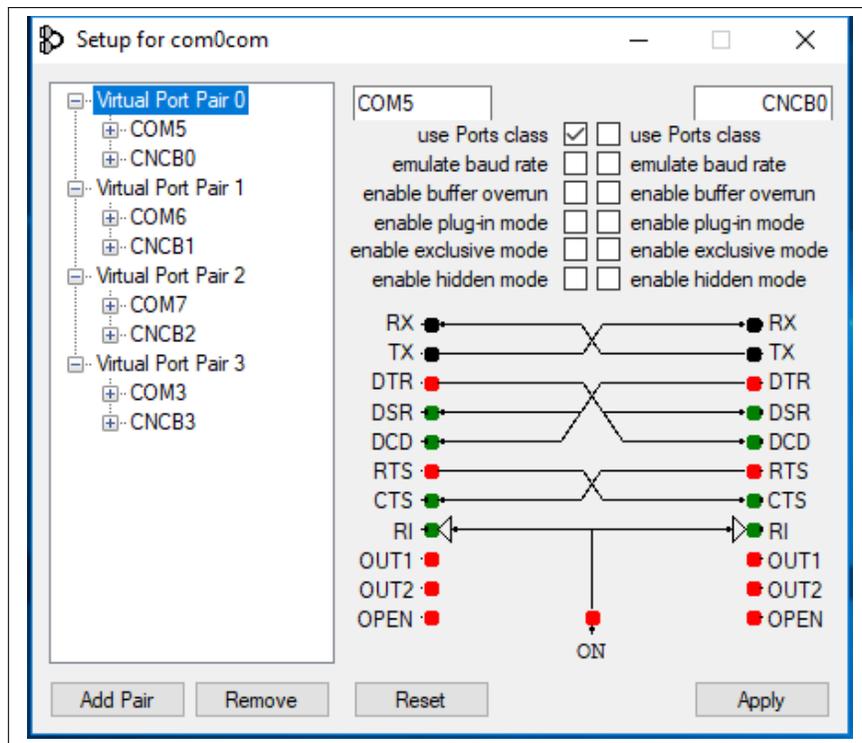


Figure 1: Setup for com0com virtual serial communication port pairs

```

1 @ECHO OFF

SETLOCAL
  IF DEFINED HUB4COM GOTO DEFINED_HUB4COM
  SET HUB4COM=hub4com
6  :DEFINED_HUB4COM

  SET OPTIONS="--load=hub4com.opt "
  @ECHO ON
  "%HUB4COM%" %OPTIONS%
11 @ECHO OFF
ENDLOCAL

```

Listing 1: listings/ptt\_control.bat

```

--create-filter=pinmap:--rts=cts --dtr=on
--add-filters=All:pinmap
3 --octs=off
--route=0:1,2,3
--route=1:0,2,3
--route=2:0,1,3
--route=3:0,1,2
8 \\.\CNCB0
  \\.\CNCB1
  \\.\CNCB2
  \\.\CNCB3

```

Listing 2: listings/hub4com.opt

**PTT control** The PTT control of the VoIP applications is done linking the CTS and RTS pins of the virtual serial communication ports. The control is started using a DOS-batch `ptt_control.bat`, see listings 1 and 2. To help starting of the script I have placed a shortcut on the Windows desktop.

The arguments for the `hub4com.exe` are placed in the file `hub4com.opt`.

**PTT control of BlueDV** The virtual communication port assigned for the BlueDV for windows is COM6. Picture 2 shows setup for BlueDV PTT keying.

**PTT control of EchoLink** The virtual communication port assigned for the EchoLink is COM7. Picture 3 shows setup for EchoLink RX control and

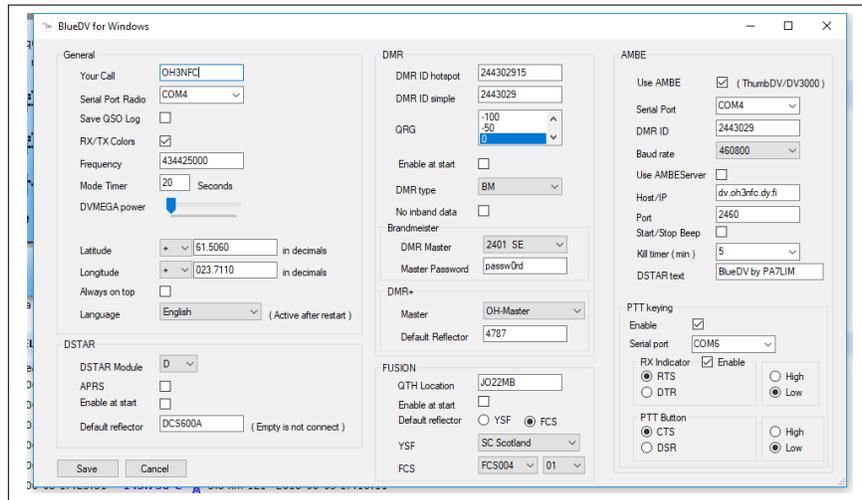


Figure 2: Setup for BlueDV, PTT keying

picture 4 shows setup for EchoLink TX control.

**PTT control of TS-Gateway Commander** The virtual communication port assigned for the TS-Gateway Commander is COM5. Picture 5 shows setup for TS-Gateway Commander COM-port.

**PTT control of Zello** The virtual communication port assigned for the Zello client running in the gateway mode is COM3. Picture 6 shows setup for TX (PC to Radio) and picture 7 shows setup for RX (Radio to PC).

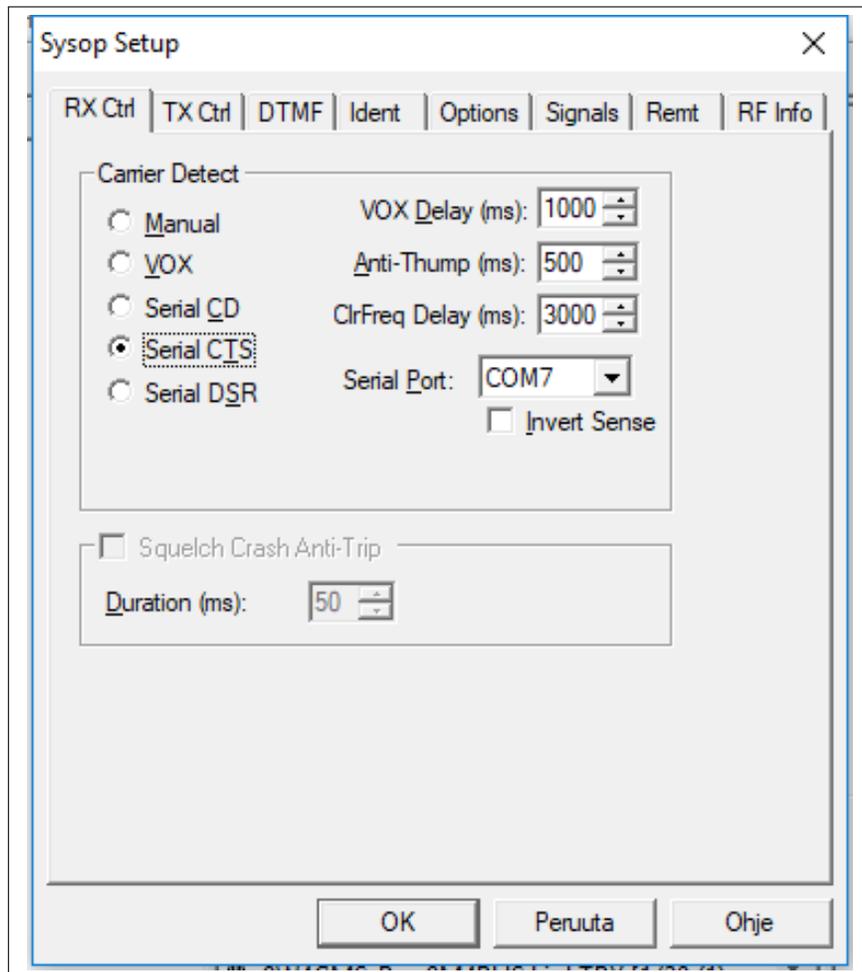


Figure 3: Setup for EchoLink, RX Ctrl

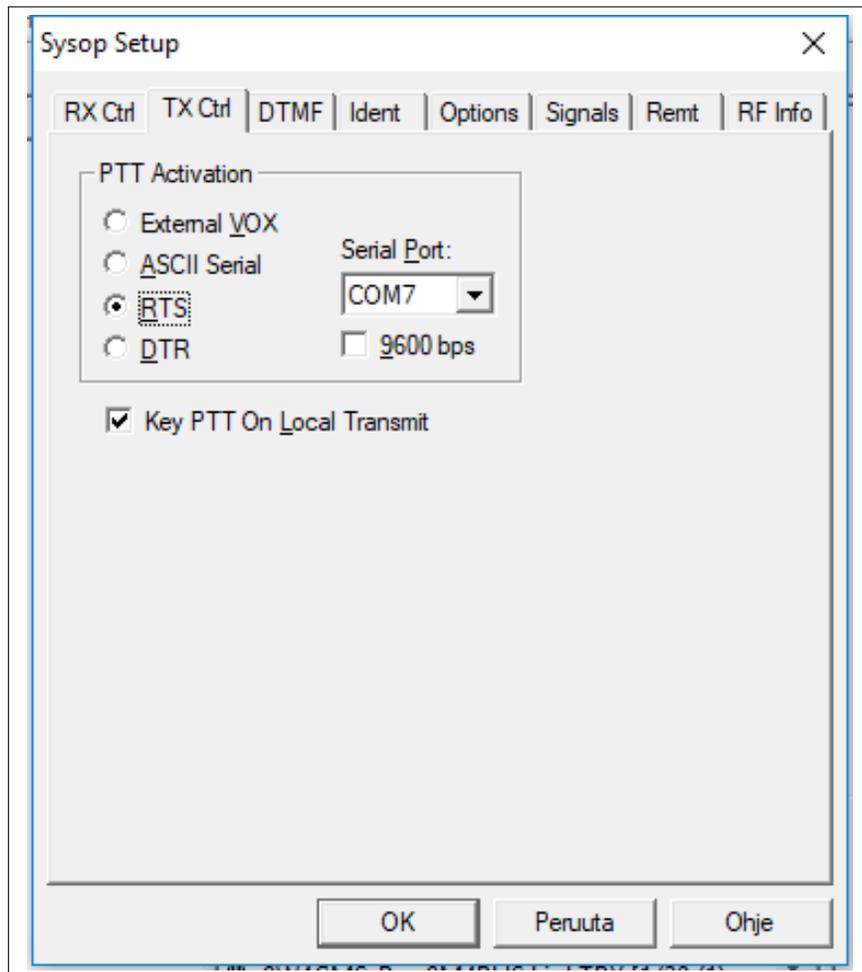


Figure 4: Setup for EchoLink, TX Ctrl

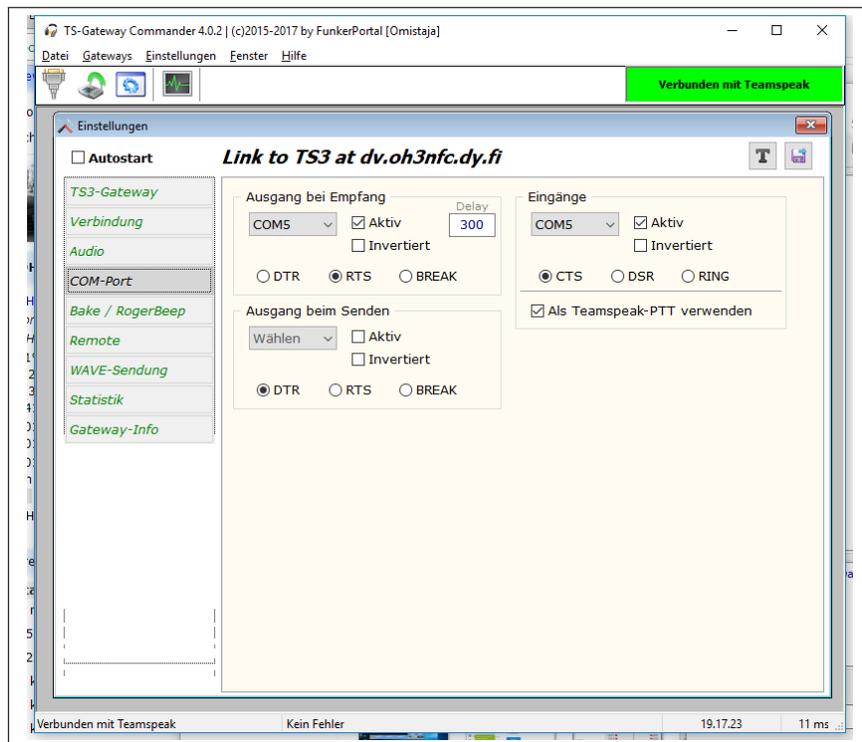


Figure 5: Setup for TS-Gateway Commander, COM-Port

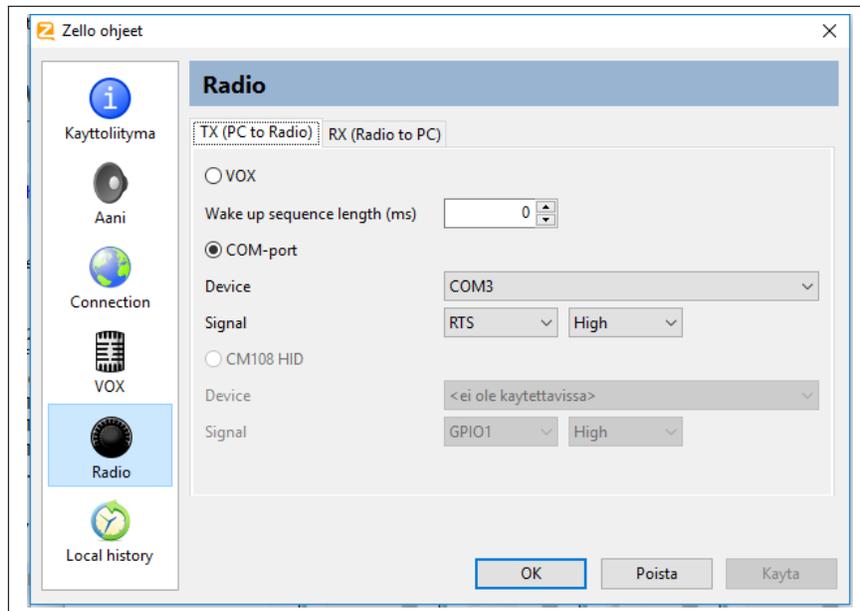


Figure 6: Setup for Zello, TX (PC to Radio)

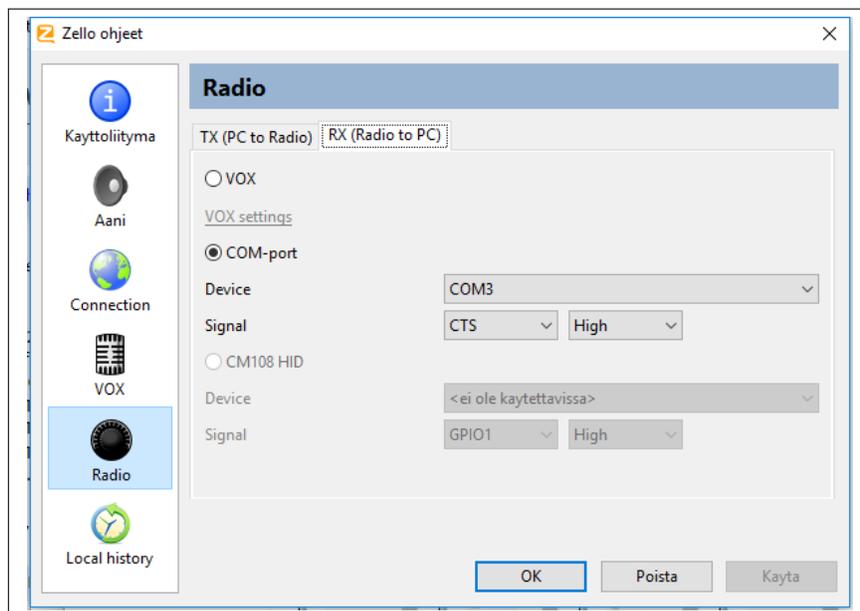


Figure 7: Setup for Zello, RX (Radio to PC)

### 3 Known issues

**BlueDV activates transmitting** Depending of the application start order BlueDV for Windows may start transmitting empty audio stream. Should this happen just hit the AMBE3000 button on the lower right conner.