ANAN-10E
FreeDV+
Setup

by Rick Peterson, WA6NUT

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Introduction

FreeDV plus Video (FreeDV+) is a soundcard mode combining digital voice (FreeDV) and low frame rate video (1 FPS). With a bandwidth of about 3.5 kHz, it is well-suited for operation on the HF bands. FreeDV+ uses NBTV software developed by Con Wassilieff, ZL2AFP, and modified for FreeDV+ by the author.

After a very enjoyable excursion into digital ATV, the author decided to revisit FreeDV+. I had replaced the old Windows 7 laptops with a new HP AMD Athlon Windows 11 laptop, so I was disappointed to find that, with the new laptop:

1 The internal soundcard input and output was accessible only via a single headset jack (the laptop is apparently designed for gamers).

2 The video RX software, which receives audio from the default input, recognizes only Stereo Mix as a source for the video signal.

This document is meant to provide the FreeDV+ operator with a setup compatible with Windows 11, and specifically the HP Athlon laptop in use at WA6NUT. The setup solves the issues involved with Windows 11 and the HP laptop. The setup works only with FreeDV modes 700D and 1600.

You're encouraged to use a batch file to open the apps used with FreeDV+. Details are given in the PDF referenced in the Figure 8 caption.

LAPTOP PCs (and associated software)

Acer Aspire 7740-5691, Windows 10 (used with Apache Labs ANAN-10E SDR transceiver)

Power SDR mRX PS v. 3.3.6 (11/16/15)

HP 17z-cp200 (Athlon), Windows 11

- FreeDV (2 instances)
- TXfftCO5L
- RXfftDIFF7L
- WinWarbler
- Volume Mixer

Acer Aspire 5516, Windows Vista (monitors TX signal)

- FreeDV
- RXfftDIFF7L
- WinWarbler

HARDWARE (see Figures 2 to 5)

Transceiver:	ANAN-10E
Transceiver:	Ten Tec Omni VII (receiver for monitoring TX signal)
Switch:	Trendnet TEG-S80g
Soundcard Interface:	MFJ-1204 (modified)
Soundcard Interface:	Homebrew (for monitoring TX signal)

Camera/Mic:	**Logitech C920**
Amplified Speaker:	**Generic**
Amplified Speaker (monitor):	**Generic**
Headset Splitter Cable:	**UGREEN 50254**
USB-Serial Cable:	**Generic**
USB Hub:	**Amazon Basics B00DQFGJR4**

SOFTWARE (and associated computers) (see Figures 6-8)

PowerSDR Open HPSDR mRX PS v 3.3.6 (11/16/15): Acer Aspire 7740-5691

FreeDV:	**Digital voice (HP Athlon (2 instances), Acer Aspire 5516)**
TXfftCO5L:	**NBTV TX (HP Athlon)**
RXfftDIFF7L:	**NBTV RX (HP Athlon, Acer Aspire 5516)**
WinWarbler:	**NBTV RX tuning (HP Athlon, Acer Aspire 5516) See Note 2.**
Volume Mixer:	**NBTV TX subcarrier adjust (HP Athlon) See Notes 1 and 5.**

REFERENCES

Download “MFJ-1204 USB Radio Interface Mods for FreeDV+” from:

https://www.qsl.net/wa6nut/MFJ-1204%20Mods.pdf

SETUP

Place the TXfftCO5L.exe, RXfftDIFF7L.exe, WNDSURF1.avi, and TESTPATT.ini files in a folder C:\Program Files\FreeDVPlusVideo.

The names for the MFJ-1204 (“USB Audio Device”) and the motherboard sound card (“Realtek Audio”) in the author's setup are used in the following procedure. Substitute the names corresponding to your setup.

1. Open the Windows Sound Playback and Record as follows:
   Control Panel --> Hardware and Sound --> Sound

   Playback: Set “Speakers USB Audio Device” as the Default output. Note that the “USB Audio Device” level control (together with the MFJ-1204 front panel “Transmit Audio Level” control) will set the FreeDV+ transmit signal level.

   Volume Mixer will set the balance between the FreeDV and video subcarrier levels (see Note 4).

   Record: Set “Stereo Mix (Realtek Audio)” as the Default input. This level control will set the level to the video receive app and WinWarbler.

MAIN FREEDV APP

2. Open the FreeDV app, and set the "Audio Config" configuration (under the "Tools" tab) as follows:

Receive

From Radio:	Sample Rate
Headset Microphone (Realtek Audio)	48000

To Speaker/Headphones:	Sample Rate
Speaker (Realtek Audio)	48000

Transmit

From Microphone:	Sample Rate
Microphone (HD Pro Webcam C920)	16000

To Radio:	Sample Rate
Speakers (USB Audio Device)	48000

3. Set the "PTT Config" configuration (under the "Tools" tab) as follows:

Hardware PTT Settings:

Use Serial Port PTT --> COM3 (select the COM port indicated by Windows Device Manager for the USB-to-Serial cable):

> Control Panel --> Hardware and Sound --> Device Manager --> Ports (COM & LPT) --> USB-to-Serial Cable

Signal Polarity:
Use RTS --> RTS = +V

The PTT button will be visible after completing this step.

AUXILIARY FREEDV APP FOR VIDEO RX

4. Open the FreeDV app, and set the "Audio Config" configuration (under the "Tools" tab) as follows:

Receive

From Radio:	Sample Rate
Headset Microphone (Realtek Audio)	48000

To Speaker/Headphones:	Sample Rate
Headphone (Realtek Audio)	48000

Transmit

From Microphone:	Sample Rate
none	

To Radio:	Sample Rate
none	

5. Set the "PTT Config" configuration (under the "Tools" tab) as follows:

   Hardware PTT Settings:

   Uncheck "Use Serial Port PTT" and "Enable PTT Input"
   The PTT button will be grayed out after completing this step.

   Click the "Switch to Analog" button.

It may be necessary to repeat Steps 2-5 each time the apps are opened.

6 Open WinWarbler and configure the sound card options: Config --> Soundcard: Check the “Stereo Mix” radio button.

7 Start the FreeDV apps and verify that the Main FreeDV app “PTT” button controls the transceiver transmit and receive functions (FreeDV+ uses the FreeDV “PTT” button). Clicking the “PTT” button should also produce an indication on the Volume Mixer “FreeDV” bar graph.

To transmit, click the “PTT” button on the Main FreeDV app (button color will change from white to red). To receive, click the “PTT” button again (button color will change back to white).

URLs FOR DOWNLOADING SOFTWARE

PowerSDR Open HPSDR mRX PS v 3.3.6 (11/16/15)

https://github.com/TAPR/OpenHPSDR-PowerSDR/releases

FreeDV

https://freedv.org/download/

TXfftCO5L and RxfftDIFF7L

https://www.qsl.net/wa6nut/FreeDVPlusDistroD.zip

WinWarbler

https://www.dxlabsuite.com/winwarbler/download.htm

NOTES

1 Volume Mixer is opened by right-clicking the Speaker icon on the Taskbar (or use the FreeDV+ batch file in Figure 8).

2 For correct video reception, the receiver must be tuned within a few Hz of the transmitter frequency. The WinWarbler waterfall provides a feature making receiver tuning easy. Just click on the B58 subcarrier (the lowest luminance subcarrier) on the WinWarbler waterfall. The WinWarbler AFC will lock on the subcarrier, and the baseband frequency will appear at the bottom left of the WinWarbler GUI twice, under the words "Receive" and "Transmit"). See Figure 1.

For correct video, the baseband frequency readout should indicate 2175 Hz for the B58 subcarrier (the yellow subcarrier in the WinWarbler waterfall in Figure 1).

Referring to Figure 1, the baseband frequency WinWarbler readout indicated 2179 Hz, an error of +4 Hz. For correct operation, the receiver should be tuned UP 4 Hz. If the WinWarbler readout had indicated 2171 Hz, the receiver would have been tuned DOWN 4 Hz for correct operation. Note that the readout indicates the baseband frequency of the yellow subcarrier (the subcarrier color changes from white to yellow when it is clicked).

3 To avoid annoying sound from the receiver output, adjust the Headphone (Realtek Audio) Playback slider control so that received video quality is good, but low enough to be inaudible (the level is set to 30 on the author's setup).

4 For correct video transmission, the amplitude of the video subcarriers should be approximately the same as the FreeDV subcarriers. The Volume Mixer provides a means for adjusting the TXfftCO5L output. Make sure the Mixer is monitoring the Speakers USB Audio Device output (use the drop down menu at the left side). After clicking the Main FreeDV app PTT button, adjust the TxfftCO5L/Live Video slider so the TXfftCO5L level (bar graph height) is approximately the same as the FreeDV level. See Figure 1.

5 To remove the video from your FreeDV+ signal (voice only), simply click the mute button on the Volume Mixer "TXfftCO5L/Live Video" channel.

6 When clicking the Start Modem on the main FreeDV app, ignore the "Could not open COM3 . . ." message. PTT will control the T/R relays in the ANAN-10E.

7 When opening apps with batch file, open RXfftDIFF7L by clicking on the blinking Taskbar icon, then clicking the "Yes" button.

8 For stations plagued with high RF noise levels (S7-S8 at the author's QTH), there's a simple solution:

a Move the PC Headset Mic connection:

From: Transceiver Headphones to PC Headset Mic

To: iPad audio out to PC Headset Mic (I use a Cubilux P6 Headphone Splitter connected at the iPad speaker jack).

b Using the iPad Safari browser, find a nearby KiwiSDR receiver (I use the KW5USA KiwiSDR in Loveland, Colorado). Go to:

https://kiwisdr.com/.public/

c Tune the KiwiSDR to 14236 kHz, select USB, and you'll be decoding FreeDV (or FreeDV+) stations received on the remote SDR. In iPad Settings, set Auto-Lock to "Never."

If you don't have an iPad, use any PC connected to the Internet.

Last revised: 2/19/26

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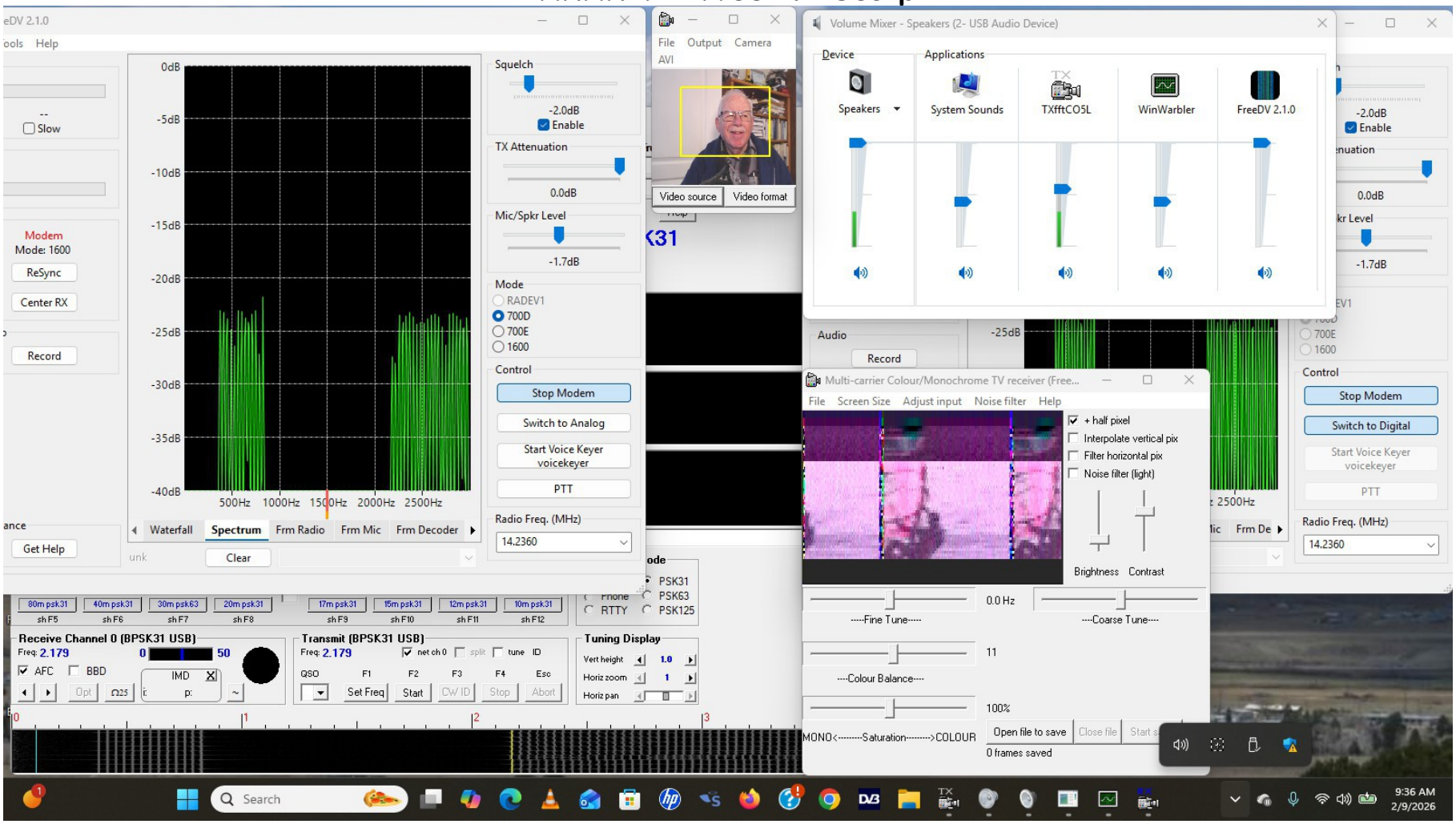

Figure 1: Screenshot with WA6NUT receiving the WNDSURF1.avi video clip from the other station. WA6NUT will be sending video from the station camera/mic (Logitech C920). Note that, for this demo, the other station is sending only video (no digital voice).

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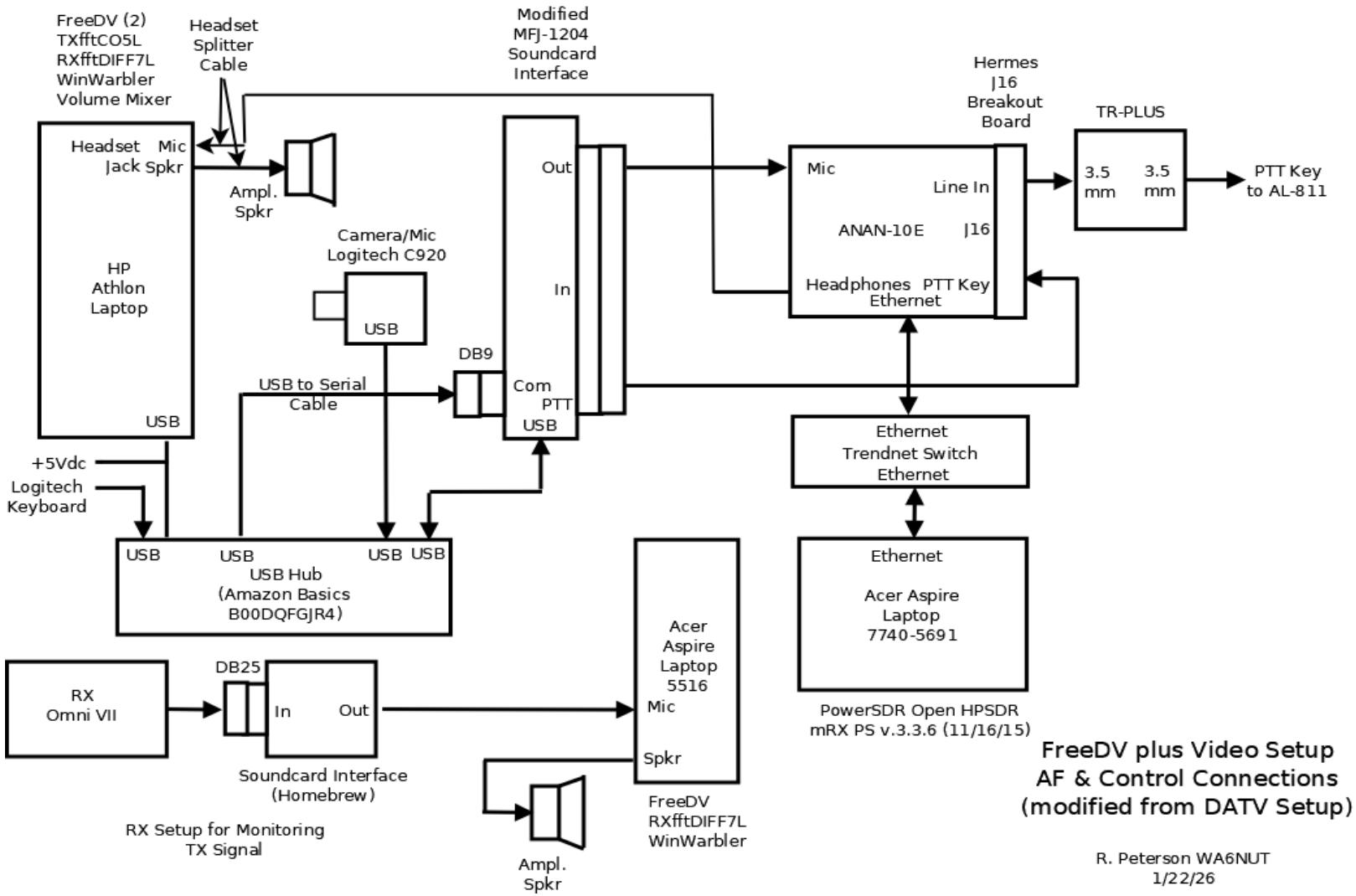

Figure 2: Block Diagram – AF and Control connections

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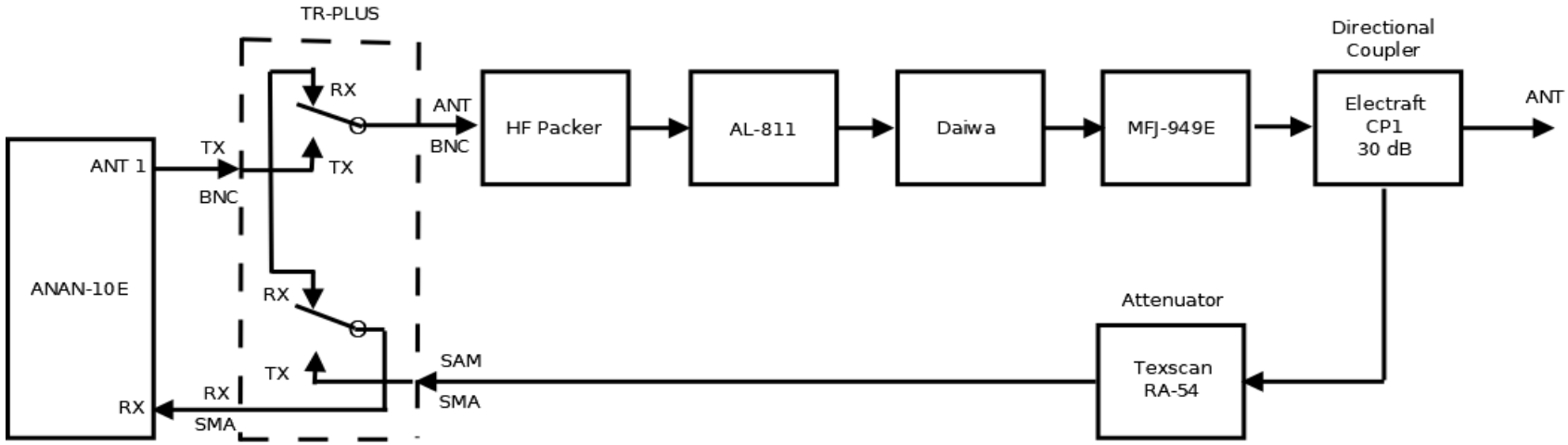

Figure 3: Block Diagram – RF connections

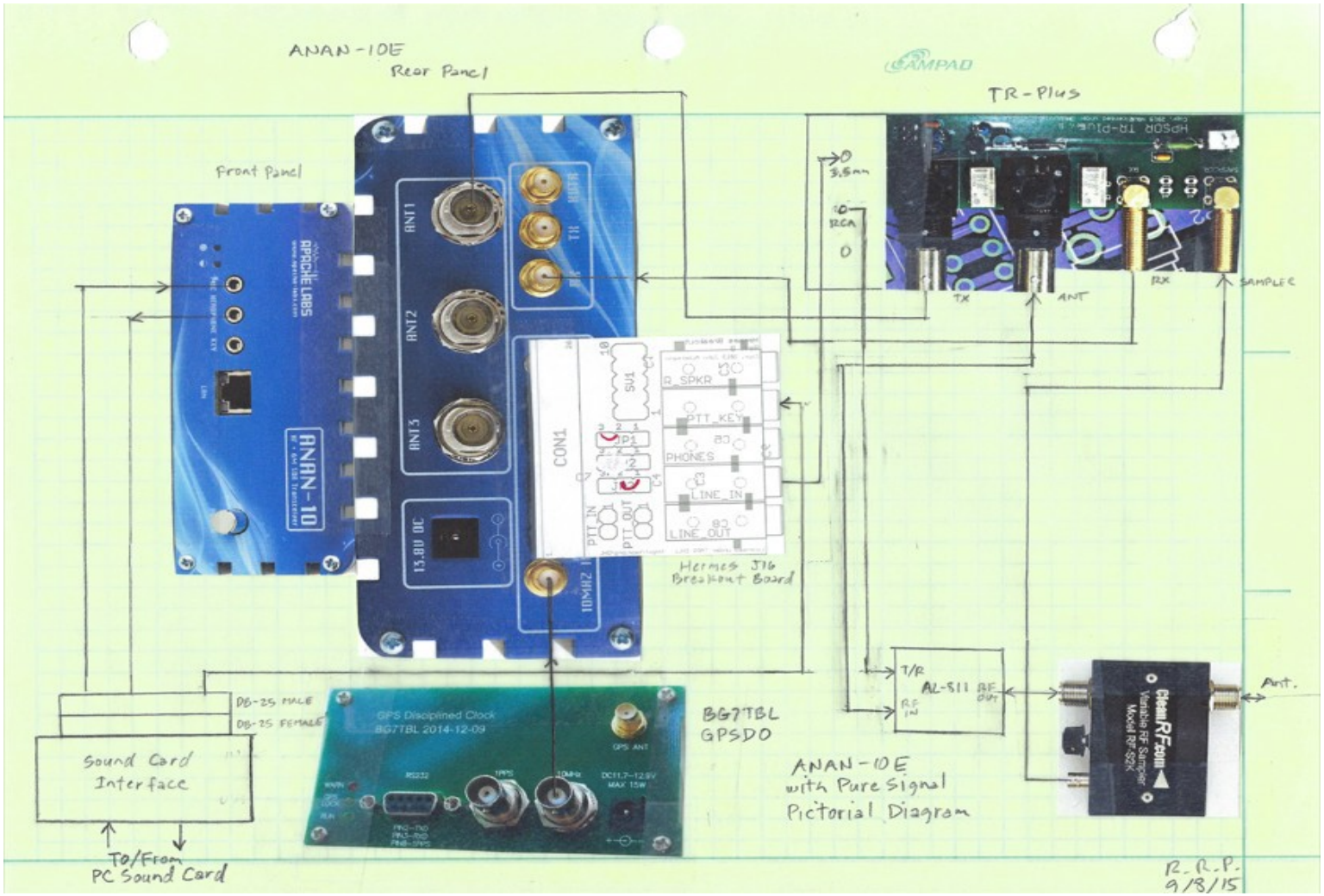

Figure 4: Pictorial Diagram – note that CleanRF sampler has been replaced by Elecraft CP-1 directional coupler and attenuator has been added in Sample line.

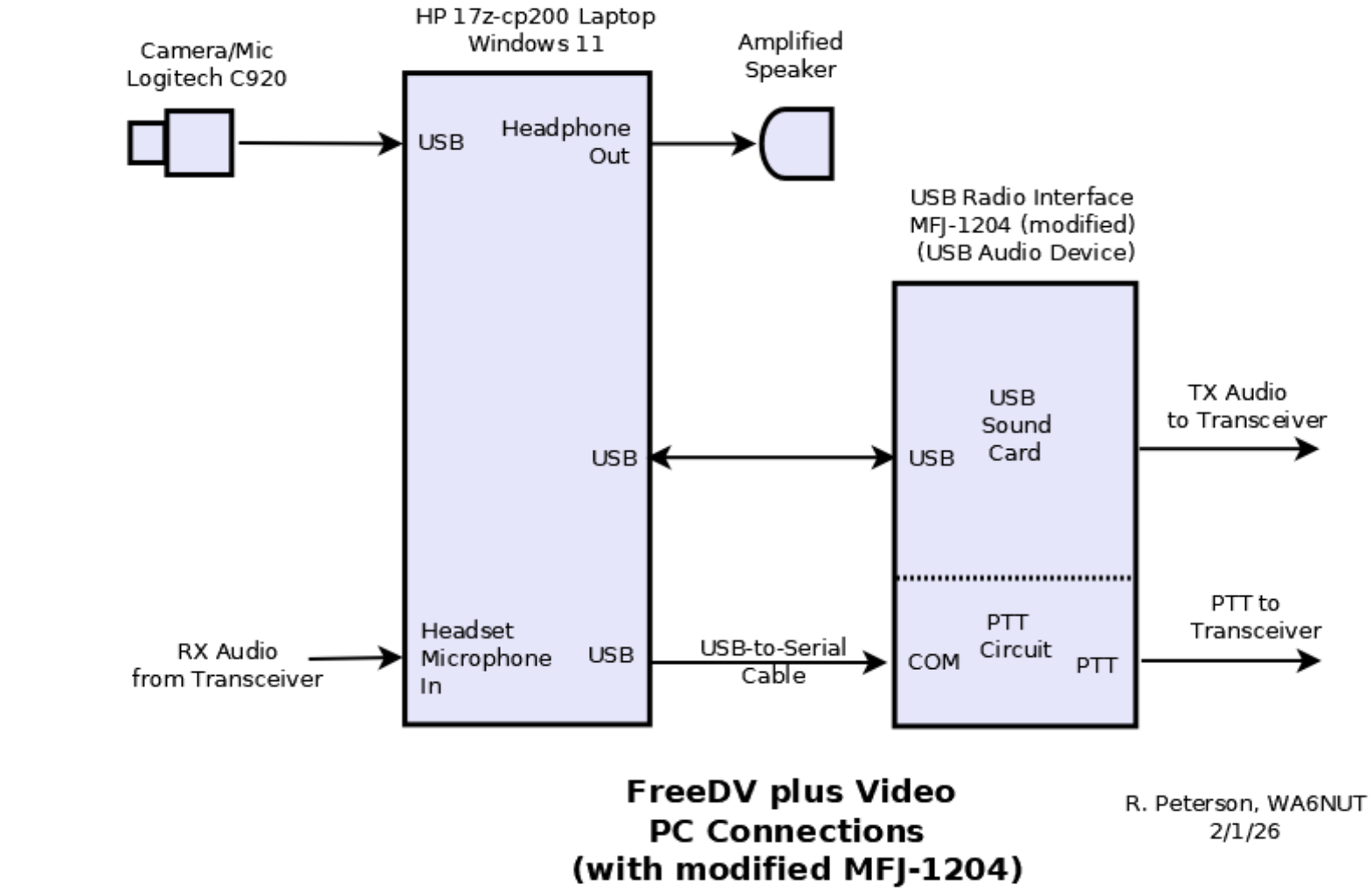

Figure 5: Block Diagram

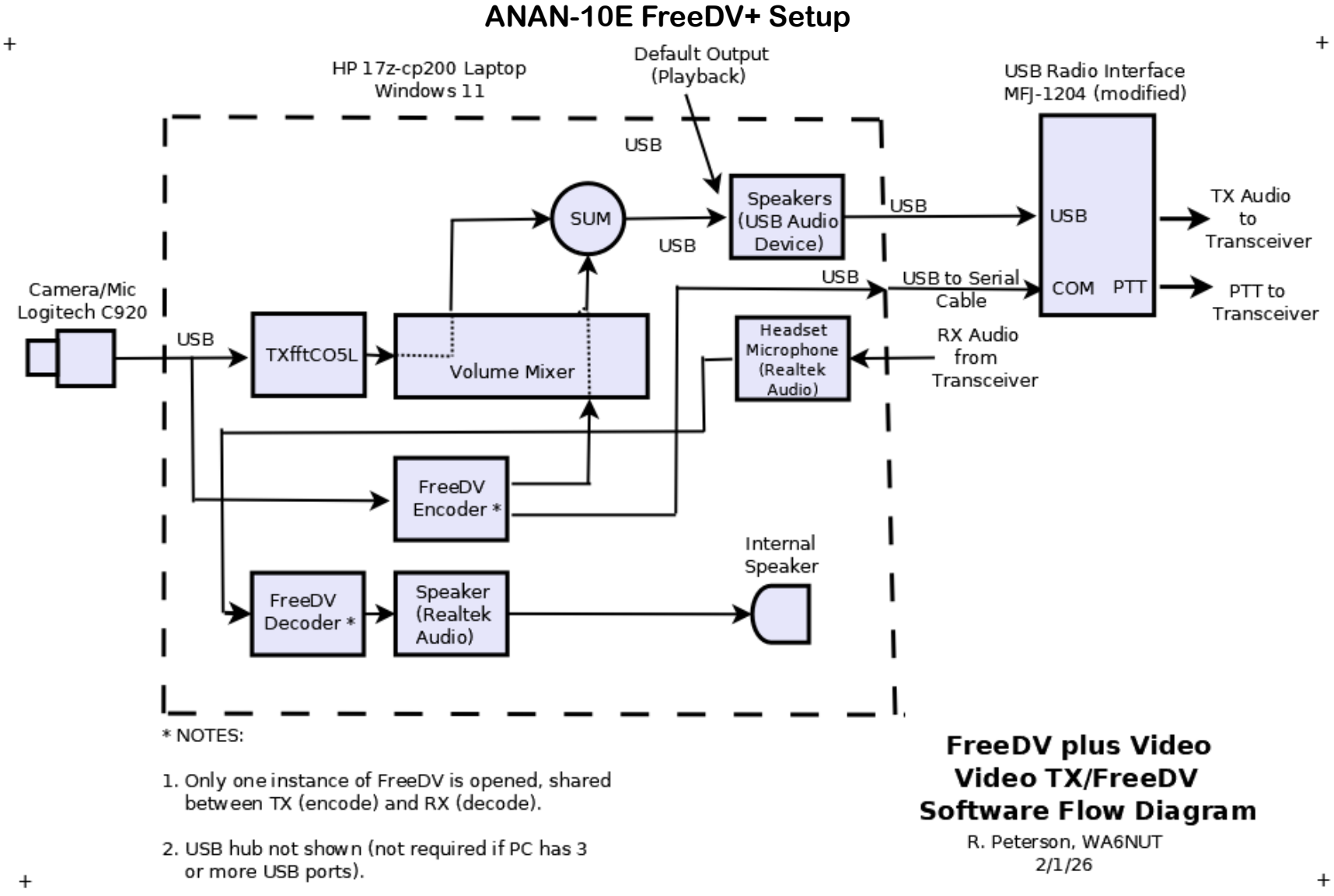

Figure 6: Video TX/FreeDV Software Flow Diagram

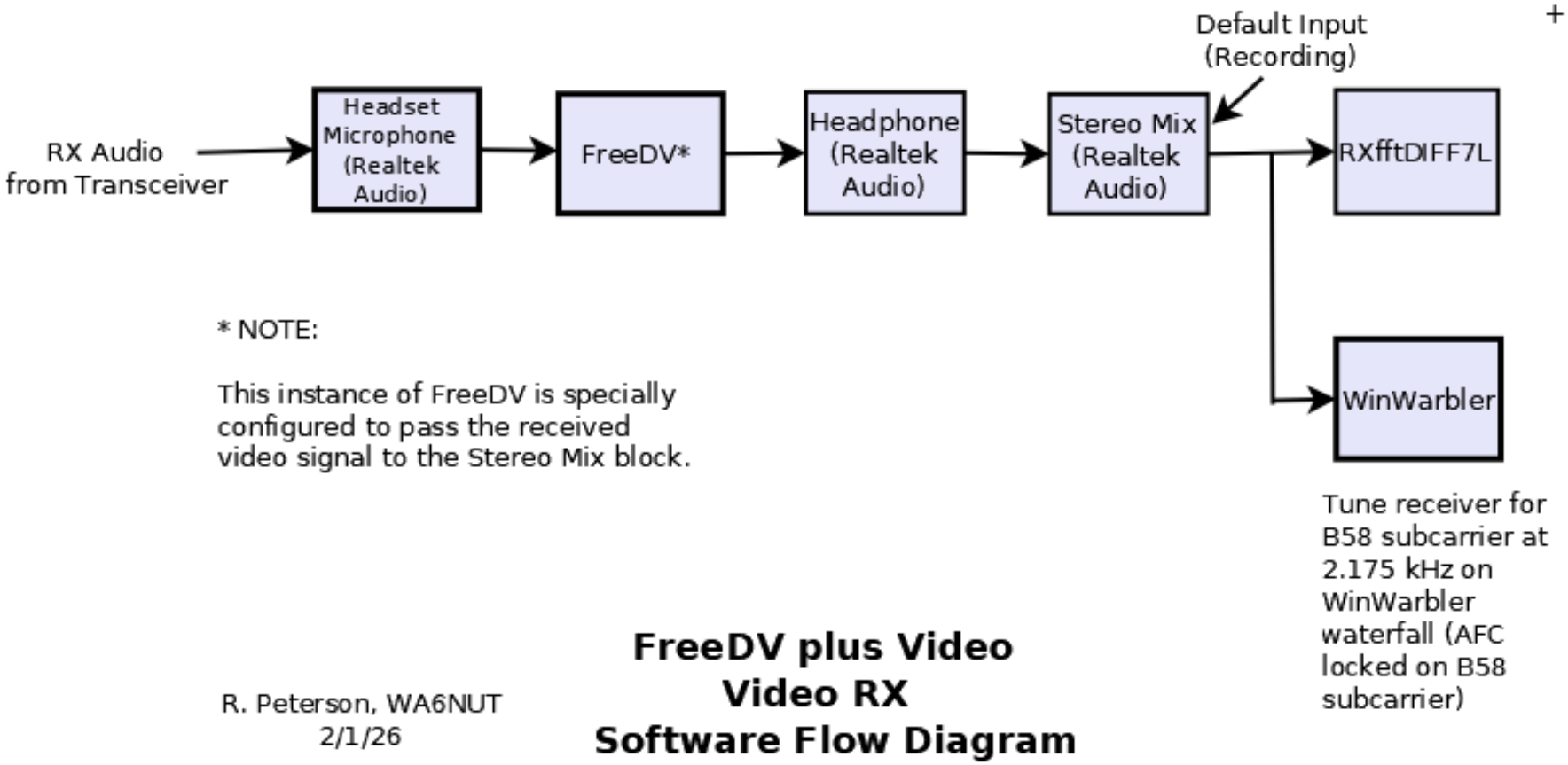

Figure 7: Video RX Software Flow Diagram

```
@echo off

title FreeDV Plus Batch

cd "C:\Windows\System32"

start mmsys.cpl

cd "C:\Program Files\FreeDV 2.1.0\bin"

start freedv.exe

start freedv.exe

cd "C:\Program Files (x86)\WinWarbler\"

start WinWarbler.exe

cd "C:\Windows\System32"

start SndVol.exe

cd "C:\Program Files\FreeDVPlusVideo"

start TXfftCO5L.exe

start RXfftDIFF7L.exe

exit
```

Figure 8: Batch File for FreeDV plus Video

All apps can be opened by left double-clicking a desktop icon. See:

https://www.qsl.net/wa6nut/FreeDV%20Plus%20Batch.pdf