

# Running JT-65 on Linux

By: Clay Abrams K6AEP 7/21/13 Rev 4

## Background

I have been in Ham Radio for most of my life. My interests have varied with all modes of communication. Some of which I was a developer and other time just a user of the mode. Since the mid 1980's my interests have been almost entirely digital communications. Since I am now retired my goals in communications have become less ambitious. I now live in a retirement community with antenna restrictions. As a result of this I have cut way back on antennas and rig power. Also the band conditions have not been that great. In my early days of ham radio, the 1950's things were far different. HF band conditions were great, few people ran KW's and had huge antenna arrays. Most rigs were home brew and modest.

I also have strong interests in computing. In the late 1990's I switched over to Linux as a primary OS. During that period I moved from Suse in the Early days to Debian as a primary OS. In recent times, I migrated like many to Mint 14 with a Mate Desktop. My major goal using this OS is to run a very powerful CPU at a fast speed, and move all general communication, web browsing and ham radio to this computer. This was not hard to do with all modes except for JT65.

## What is JT65

I am sure many of you are wondering what is JT65? JT65 is a slow digital communications mode which is catching on very fast. The main reason for this is because of hams like me. If you can't install a huge antenna and don't wish to run high power, but make QSO's easily in HF. This is the mode for you. The only complaint I hear about JT65 you can't rag chew, the mode is impersonal. If you feel this way then PSK31 might be your answer.

JT65 is amazing. You may feel the HF Band is completely closed. List on a JT-65 frequency and you might hear ton's of station. Tune across the HF SSB frequencies and you will hear nothing. This article is not a primer on JT-65 but a guide so many users how to install it and get it working on Linux.

## Available JT65 Software

Two widely available HF packages are available from many sources. One is WSJT-X the other JT-65-HF. In my early implementation, I have used JT-65-HF. I found it to be one of the best user friendly packages available for any ham radio mode. I used it extensively for many months. I used it on both Windows 8 and Windows 7. What can I say, I endured the pain of both of these Windows OS's for months and kept saying there must be another way.

I tried using the Linux version WSJT and could never get the software audio to work with my rigs. I tried using pre-compiled versions and re-compiled WSJT on various Linux Distributions and finally gave up. I could never get my rig audio to be recognized.

I recently discovered a new release of WSJT-X Ver 1.1 r3496 which has become my favorite JT-65 application of choice. It is in Beta Release now. I been reviewing it and find it well written and solid. My only issue is that it is only a Windows Code release. More on this software later.

## **Installing JT-65-HF or WSJT-X Ver 1.1 on Linux**

JT-65-HF at one time had a re-compiled version for an early level of Linux. The package is no longer supported by the author. It was never ported to a current version of Linux, nor is the current software source available. So if you wish to run JT-65-HF on Linux you must use the Windows Binaries. I tried like many others to use the JT-65-HF binaries on Linux Wine and Crossover. These packages allow you to run some Windows programs on Linux. I was able converted a executable binary version of JT-65-HF software to run on Crossover It has various UI Interface problems, and I could not get the audio to be recognized. I finally gave up.

I next tried VMWare on JT65-HF. This product allows Windows to be installed and ran in a virtual mode. The product has a reasonable price tag. I tried installing in Vmware Win7 and Win XP. I was able to install JT-65-HF on both Windows versions. The problem I found was with configuration of the Audio Interface from my Ham Radio Rigs. I think it next appropriate to tell about the rigs I used.

### **My Ham Rigs**

I have two HF Ham rigs with analog to digital interfaces.

1. Kenwood TS-590S – This Rig has a built in USB serial/audio Interface compatibly with Linux or Windows. The interface works flawlessly on both OS's but requires a driver on Windows.
2. Elecraft KX3 – This rig does not have a built in Audio interface. I used a SignalLink interface. This interface can be used on Many Rigs and function exactly the same as on the KX3. I purchased the KX3 interface cable from Tigertronics.  
<http://www.tigertronics.com/slusbmain.htm>

I did get the TS-590 functional on the Vmware XP by by selecting the audio USB Codec and a input to the software. This seemed to be functional but not reliable. After playing around for a while I could make it function. But powering up and down the system, things were not solid. Performance seemed slow and jerky even using a system with a Intel(R) Core(TM) i7-3820 CPU @ 3.60GHz. I even configured Vmware for 8 CPU's which did not help. Again I gave up with this configuration.

I tried using the exact same setup using the exact same setup running Vmware using a Win7 Professional Virtual system. Performance was so bad the system was completely unusable. JT-65-HF performance was jerky and seemed to cut in and out like my CPU did not have enough horse power?

How could this be? I was using one of the fastest CPU's available from Intel.

### **A solution which worked**

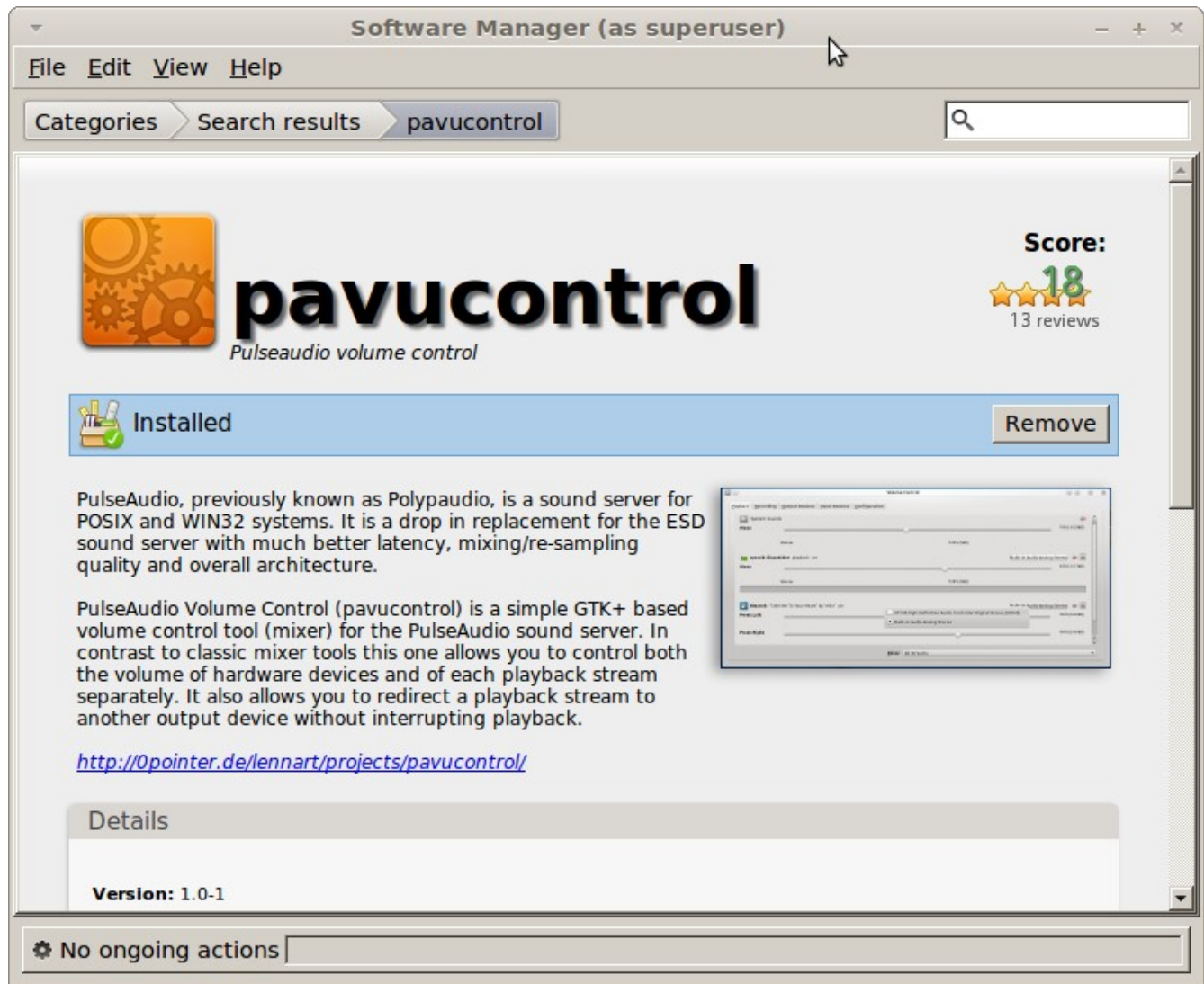
My next configuration was to use Oracle VM Virtual Box. This software allow any version of Window or Linux to run in virtual mode on Linux. The software was free for the download from this site <https://www.virtualbox.org/wiki/Downloads>

Just download the version compatibly with your Linux system. Also install the Virtual Box extension pack. No need for me to detail this process it is well documented on the Oracle Web Site.

I next installed a version of XP software which included the SP3 update package. I think almost any

version of XP will work. I used a version of XP with Service pack 2 installed. Not sure if this is required?

One of the problems of Vritual Box software is that it will not allow you to connect directly to a USB Audio Codec plugged into the system. My Linux system by default uses Pulse Audio. This is true for most Debian Linux distributions in 2013. Pulse Audio allows you to connect many Audio Devices and then select the one you wish to run on Linux. Debian Ubuntu and Mint comes with a utility which makes this very easy. Just Install this following software package.



Once this is installed you can plug your ham radio interfaces into your system and configure them for use with JT-65.

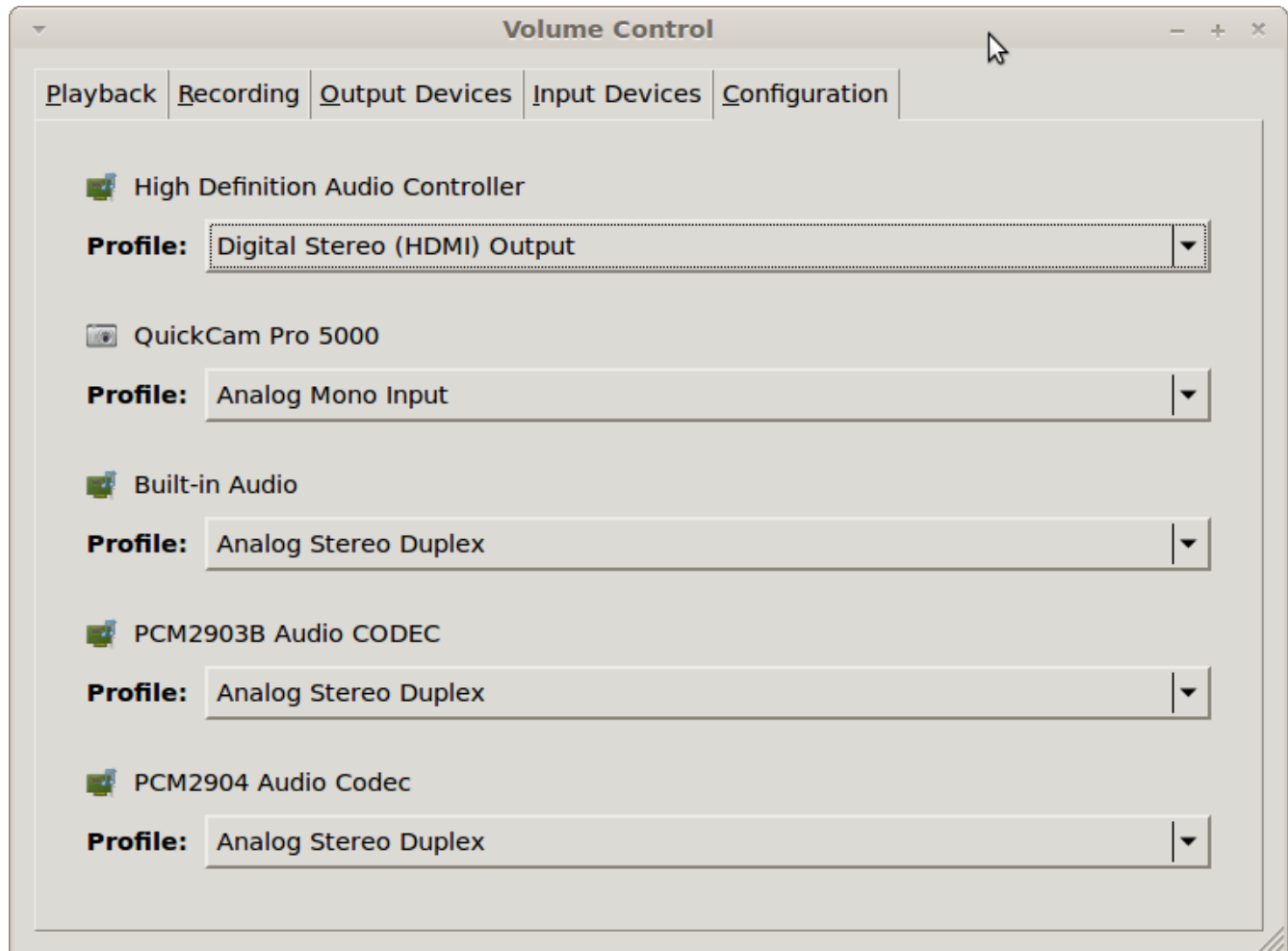
The next screen screen capture will show all the audio devices plugged into mys system.

The two Audio Codecs from the ham radio rigs are shown as:

1. PCM2903B – This is the Codec from the Kenwood TS-590s USB audio ports.
2. PCM2904 – This is the Codec from the Signal Link USB audio ports.

I guess you could plug many other interfaces ham rig into your computer and decide which one to use at a later date.

Remember that USB audio devices plugged into the computer do not need power. Even if the rig is not power on the Codec will show.

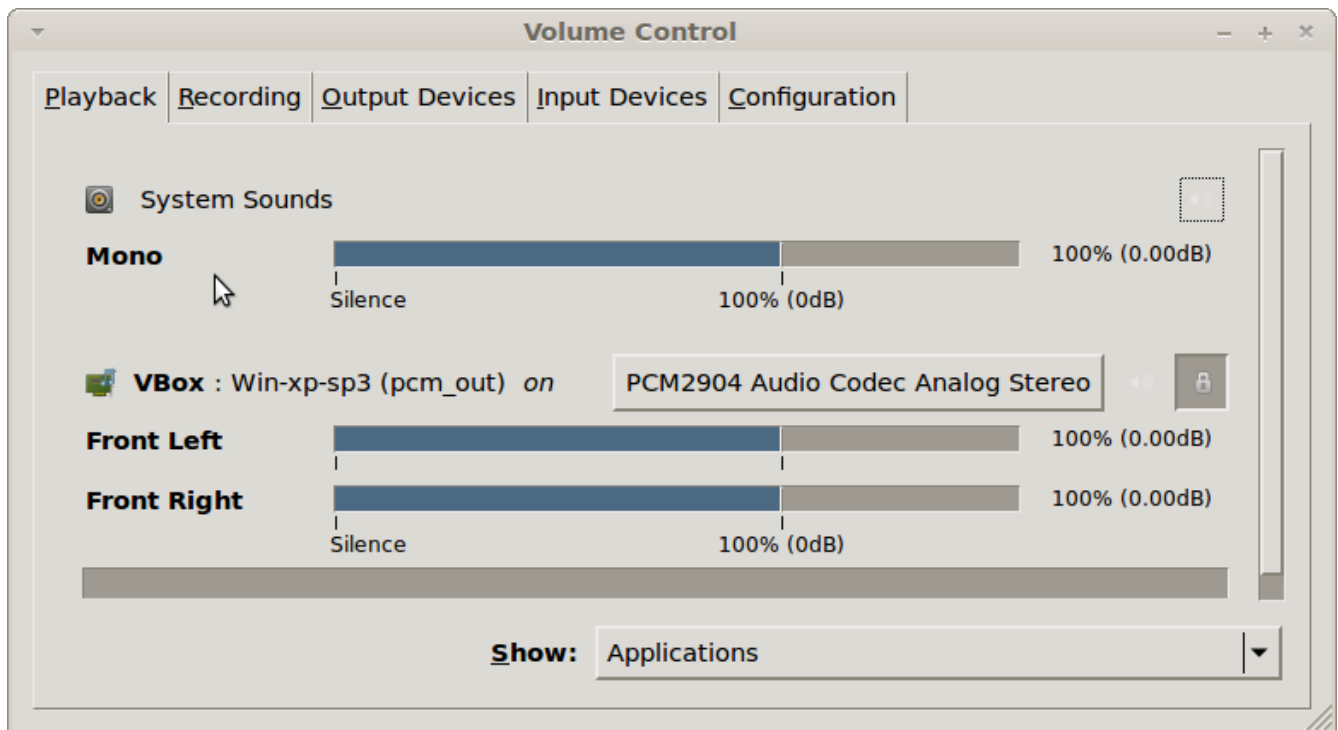
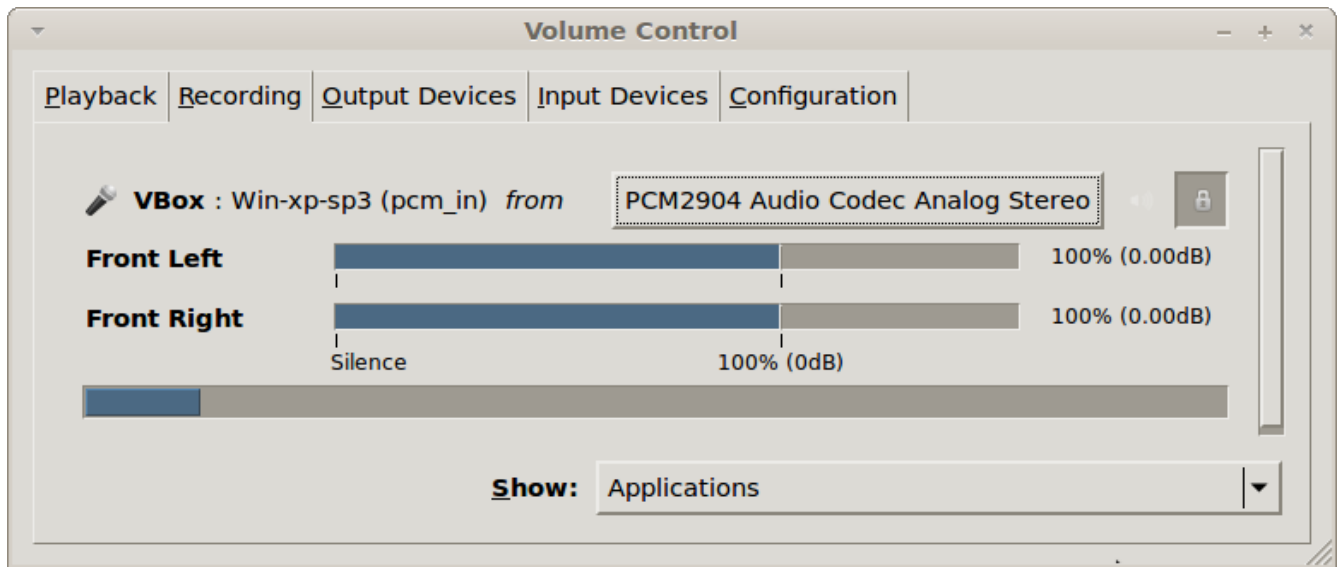


The next step is to assign which audio stream will be routed to the Virtual Box Software.

You can see in this example I selected the Elecraft KX3 interface on the PCM2904 interface as my interface to JT-65.

You should be aware that the KX3 must be run with about 4 watts output to keep from over heating. I use a Ten Tech 418 amplifier. I mostly run 50 watts of less on JT-65 and have made over 700 QSO's in 5 months using just a wire antenna (57 feet long) about 20 feet high. End fed with a UnUn Balun.

With 4 watts out of the KX3 I can run 100w on JT65 if I wish. Using 4 watts the KX3 does not ever make the case on the KX3 hot. With many long successive transmissions the KK3 seems to run well.



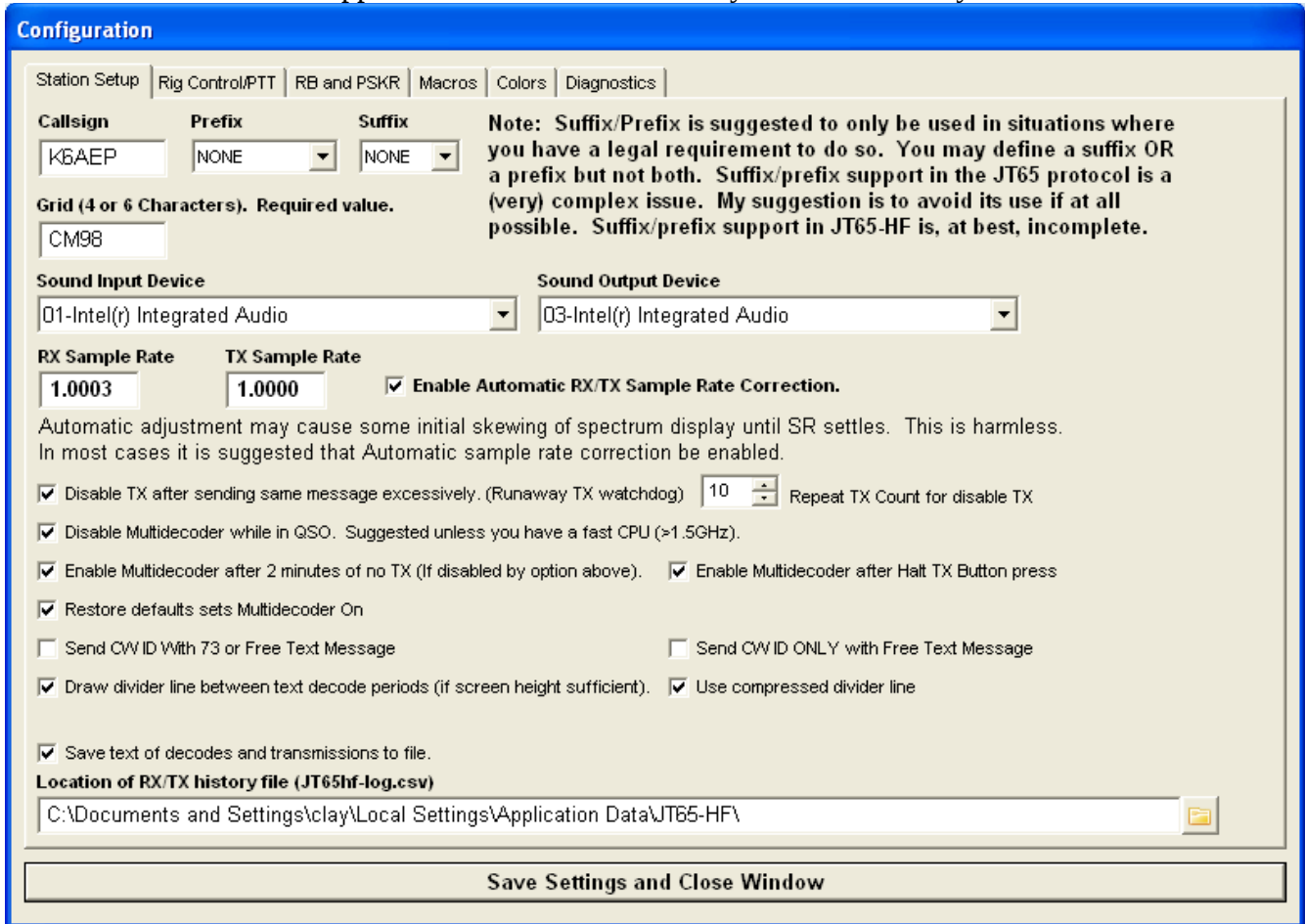
To adjust the sound levels to the JT-65 software (JT-65-HF or WSJT 1.1) use you mouse on the Linux Pavucontrol software to adjust the sound levels of the applications running in the in the XP Virtual Windows.

Next I show how to configure JT-65-HF or WSJT-X 1.1 running Oracle Virtual Box for the Pulse Audio Interface.

My virtual Windows system uses Intel Integrated Audio from the Oracle Virtual Box.

I am not sure what other configuration or levels of XP will require.

The software has been running solid for weeks. I keep my main Linux system on from when I wake up and I go to bed. I usually have APRS (Xastir) running in one Linux virtual window and JT65 in another. Guess I could run Fldigi in yet another link's window. My system has so much power it would allow all these ham radio application to run simultaneously with no difficulty.



The following is the screens of the Virtual XP system running JT-65 on Linux.

The following is a complete screen shot of my Linux Virtual Mint 14 Desktop with JT65-HF running. I also included an screen capture image of WSJT Ver 1.1 running on Linux. This WSJT 1.1 image was created just after calling CQ on 15 meters. Joe Taylor K1JT the author of the software returned to to my call. You can see in the center of the image where I logged this QSO with this software. Thanks Joe for the QSO and for writing such a solid user friendly software package. I am sure many people will enjoy your software for years to come.

After my initial install of the system using Mint 14, I repeated the process using Mint 15. The only major difference is that I used Virtual Box software install available using the Mint "Software Manager". This was a very simple install. A older version of Virtual Box 4.1.20 was used. All worked the same and performance was stable and consistent as I experiences using Mint 14.

To the left of the Oracle Screen is a copy of my logging program with I use. It is called Jlog. The software is written using Java and runs on both Windows and Linux.

<http://jlog.org/>

The screenshot shows the JT65-HF software interface. At the top, there's a title bar and menu options. Below that, there's a waterfall plot showing signal activity. To the left of the plot are audio input level controls. Below the plot is a large log table with columns for UTC, Sync, dB, DT, DF, and Exchange. To the right of the plot are controls for the current operation, including a message to TX and TX progress indicators. At the bottom, there are controls for TX DF, RX DF, and other transmission parameters.

**2013-Jul-04 19:27:34**  
**Dial QRG KHz: 21076**

**Current Operation: Receiving**

**Message To TX: 2E0ZRQ K6AEP 73**  
**TX OFF**

UTC	Sync	dB	DT	DF	Exchange
19:26	1	-18	-0.1	266	B F4GBD LU8DIO RRR
19:26	5	-13	-0.0	-223	B W4UAT WN0Y EN42
19:26	11	-5	-0.2	-431	B ON1AEY K5NAA DM81
-----					
19:25	2	-18	0.1	-86	B CQ PP5ZAP GG43
19:25	5	-10	-0.4	-223	B CQ W4UAT CM97
19:25	4	-13	-0.2	-463	B KB7QOS N7NSO R-07
19:25	3	-23	0.1	-724	K W3SFG JA1RNJ QM05
19:24	5	-18	-0.1	266	B F4GBD LU8DIO -11
19:23	4	-14	0.2	-70	B DK9HS PP5ZAP 73
19:23	7	-13	-0.3	-256	B CQ W4UAT CM97
19:23	4	-14	-0.4	-463	B KB7QOS N7NSO RRR
19:23	9	-14	-0.0	-724	B KL7J WN0Y EN42
19:22	3	-16	-0.1	266	B CQ LU8DIO GF05
19:22	3	-19	-1.1	-463	K N7NSO KB7QOS R-09
19:22	9	-7	-0.3	-724	B CQ KL7J BP40

**TX DF: 748** **RX DF: 748**  TX DF = RX DF **TX to Call Sign: 2E0ZRQ** **Rpt (-#): -21**

**Single BW: 100** **Multi BW: 100**  Enable Multi **Log QSO**

**Sound In:**  
01-Intel(r) Integrated Audio

**Sound Out:**  
03-Intel(r) Integrated Audio

jLog

File View Entry Report Contest Spot Tools Help Registered to: Clayton Abrams (K6AEP)

Date	Time	Station	Frq	Mode	Pwr	Conf	Sent	Rcv	End	Name	QTH	Remarks
2013-06-25	23:15	VK3BM	21	JT65	50	D1	R-13	R-16	23:18	QF22		
2013-06-27	03:23	K6EPC	10	PSK31	50	D	589	599	03:33	Dan	Lancaster, CA	EPC #40 #4
2013-06-27	01:36	KC9RNK	14	JT65	50	D	R-14	R-17	01:41	EN91		
2013-06-27	04:05	W2PFA	14	JT65	50	D1	R-11	R-06	04:07	DM13		
2013-06-27	19:45	K4AFR	14	JT65	60	D1	R-11	R-07	19:52	EM73		
2013-06-27	23:46	JG1ERW	21	JT65	60	D1	R-13	R-08	23:48	PM95		
2013-06-28	00:03	K8BMA	18	PSK31	50	D	579	599	00:11	Rick	Saline, Michi...	Unix user sl
2013-06-28	00:41	N3HYX	21	JT65	50	D1	R-02	R-05	00:44	EM74		
2013-06-28	03:08	W1TG	18	PSK31	50	D	599	599	03:11		Hampton Be...	
2013-07-01	01:51	N2AIE	14	JT65	50	D1	R-09	R-09	01:54	EN42		
2013-07-01	17:29	WD7WW	14	JT65	50	D1	R-19	R-10	17:31	DM43		
2013-07-01	18:48	W4UAT	14	JT65	50	D1	R-11	R-15	18:50	CM97		
2013-07-01	19:38	WX4MB	14	JT65	50	D1	R-14	R-14	19:41	DM43		
2013-07-01	21:42	K9GVY	21	JT65	70	D1	R-18	R-17	21:46	EN61		
2013-07-02	16:43	KC9REX	21	JT65	50	D1	R-16	R-16	16:45	EM69		
2013-07-02	17:27	WX7MB	14	JT65	50	D	R-10	R-17	17:33	DM43		
2013-07-02	17:43	WA0JCE	14	JT65	50	D	R-07	R-04	17:45	EN00		
2013-07-02	23:11	N3YQA	21	JT65	70	D	R-17	R-10	23:16	FN10		
2013-07-02	23:50	K0GDI	14	JT65	50	D	R-22	R-15	23:55	EM48		
2013-07-03	02:36	VE3RYI	14	JT65	60	D	R-06	R-14	02:39	FN03		
2013-07-03	03:02	K89BYN	10	JT65	70	D	R-20	R-10	03:07	EN60		
2013-07-03	03:39	N8HS	21	JT65	50	D	R-11	R-09	03:43	EN82		
2013-07-03	17:56	KF4RWA	18	JT65	60	D	R-13	R-12	18:01	EM63		
2013-07-03	18:38	LU3AEA	21	JT65	80	D	R-23	R-12	18:40	GF05		
2013-07-03	18:48	K3NAW	21	JT65	50	D	R-15	R-08	18:54	FN10		
2013-07-03	19:00	K8SWE	21	JT65	50	D	R-24	R-16	19:02	EN53		
2013-07-03	19:23	AK4BB	21	JT65	50	D	R-10	R-10	19:25	EM83		
2013-07-03	19:33	W4KCM	21	JT65	50	D	R-05	R-04	19:36	EM95		
2013-07-03	21:32	K4OP	21	JT65	50	D	R-15	R-14	21:35	EM77		
2013-07-03	22:28	PV8ELO	21	JT65	80	D	R-19	R-18	22:31	GI25		
2013-07-04	16:30	JJ2QYR	21	JT65	70	D	R-18	R-08	16:32	PM86		
2013-07-04	16:39	KJ4DJ	21	JT65	70	D	R-10	R-06	16:41	FM05		
2013-07-04	16:57	K5HGK	21	JT65	70	D	R-14	R-23	17:00	EM11		
2013-07-04	17:26	PP5ZAP	21	JT65	70	D	R-14	R-09	17:30	GG43		
2013-07-04	17:59	2E0ZQR	21	JT65	90	D	R-21	R-21	18:01	JO03		

Country: ENGLAND    Callsign search: p 1 8 9 5 7 10 14 18 21 24 28 50 144

co: 14    ity: 27    CW: SSB

33° 5252 miles    Previous contacts with the ...    Station:    Country:    213° 19620 miles

Date	Time	Station	Frq	Mode	Pwr	Conf	Sent	Rcv	End	Name	QTH	Remarks
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Win-xp-sp3 [Running] - Oracle VM VirtualBox

JT65 HF Version 1.0.9.3 [K6AEP QRV]

Setup Rig Control Raw Decoder Transmit Log About JT65-HF

Audio Input Levels: L 10, R 20

Optimum input level is 0 with only background noise present. Digital Audio Gain: L 0, R 0

2013-Jul-04 19:31:16

Current Operation: Receiving

Dial ORG KHz: 21076

Color-map: Brightness Contrast Speed Gain

Message To TX: 2E0ZQR K6AEP 73

TX Text (13 Characters): TX OFF

TX Generated: TX Even TX Odd

2E0ZQR K6AEP 73

TX DF: 748, RX DF: 748, TX to Call Sign: 2E0ZQR, Rpt: 21

Single BW: 100, Multi BW: 100, Enable RB: , Enable PSKR:

RB/PSKR Counts

Sound In: 01-Intel() Integrated Audio

Sound Out: 03-Intel() Integrated Audio

UTC	Sync	dB	DT	DF	Exchange
19:30	2	-14	0.1	606	B VA3DYD PP5ZAP R-16
19:30	18	-5	-0.8	-30	B CQ K5HGK EM11
19:30	8	-11	-0.2	-226	B CQ K5NAA DM81
19:28	4	-10	-0.2	579	B VA3DYD PP5ZAP GG43
19:28	3	-17	-0.1	264	K TNX73-20W-DIP
19:28	13	-7	0.1	-223	B CQ K5NAA DM81
19:28	3	-20	-1.2	-466	K CQ KB7QOS DN71
19:27	6	-14	-0.5	565	B CQ VA3DYD FG03
19:27	14	-13	0.2	272	B NU60 AE5CP EM26
19:27	5	-11	-0.4	-223	B CQ W4UAT CM97
19:27	9	-13	-0.2	-463	B KB7QOS N7NSO 73
19:27	2	-25	-0.0	-724	K W3SFG JA1RNJ QM05
19:26	1	-18	-0.1	266	B F4GBD LU8DIO RRR
19:26	5	-13	-0.0	-223	B W4UAT WN0Y EN42
19:26	11	-5	-0.2	-431	B ON1AEY K5NAA DM81
19:25	2	-18	0.1	-86	B CQ PP5ZAP GG43
19:25	5	-10	-0.4	-223	B CQ W4UAT CM97
19:25	4	-13	-0.2	-463	B KB7QOS N7NSO R-07

start    JT65-HF    Search Desktop    12:31 PM



jLog Registered to: Clayton Abrams (K6AEP)

Date	Time	Station	Frq	Mode	Pwr	Conf	Sent	Rcv	End	Name	QTH	Remarks
2013-07-16	23:15	KC9RNK	14	JT65	50	D	R-05	R-12	23:17	EN91		
2013-07-16	23:25	N8CGY	14	JT65	50	D	R-22	R-12	23:29	EN74		
2013-07-17	04:29	AB0YM	10	JT65	40	D	R-10	R-10	04:32	DM79		
2013-07-17	04:36	K7LFV	10	JT65	50	D	R-01	R-05	04:38	DN18		
2013-07-17	04:52	KB7N	7	JT65	40	D	R-09	R-04	04:56	CN97		10 Loc
2013-07-17	17:16	K3L	18	JT65	30	D	R-09	R-11	17:19	EN92		
2013-07-17	18:20	WX7MB	18	JT65	50	D1	R-15	R-07	18:22	DM43		
2013-07-17	18:30	NSLYJ	18	JT65	40	D1	R-17	R-19	18:34	EM03		
2013-07-17	20:16	LU8EX	21	JT65	70	D	R-14	R-06	20:18	GF05		
2013-07-17	20:49	WR1Z	18	JT65	70	D	R-14	R-12	20:52	FN42		
2013-07-18	01:17	N5ETH	10	JT65	50	D	R-05	R-06	01:19	EN52		
2013-07-18	01:27	K4AWB	10	JT65	50	D	R-17	R-11	01:31	EM55		
2013-07-18	01:40	W9ANT	10	JT65	50	D	R-05	R-11	01:44	EN91		
2013-07-18	01:49	N6TE	10	JT65	50	D	R-01	R-01	01:53	DM12		
2013-07-18	02:09	FK8HG	14	JT65	100	D	R-19	R-09	02:11	RG37		
2013-07-18	02:27	KM5LY	14	JT65	70	D	R-08	R-14	02:29	EM12		
2013-07-18	02:56	N2YI	10	JT65	50	D	R-18	R-10	02:59	FN13		
2013-07-18	03:55	KB7N	7	JT65	50	D	R-04	R-06	03:58	CN97		25w st
2013-07-18	04:16	N50AO	7	JT65	50	D	R-11	R-13	04:20	EM13		
2013-07-18	04:26	KK3Q	7	JT65	70	D	R-10	R-14	04:29	EL98		
2013-07-18	04:37	W66EZ	7	JT65	50	D	R-03	R-14	04:42	EM10		
2013-07-18	15:17	J03IEE	14	JT65	70	D	R-21	R-20	15:21	PM74		
2013-07-18	16:35	KB7MM	18	JT65	50	D	R-05	R-12	16:39	Jim Medford, OR		
2013-07-18	16:43	WE7P	18	JT65	50	D	R-05	R-09	16:45	CN87		
2013-07-18	23:15	VV4GN	18	JT65	50	D	R-08	R-12	23:17	PK50		
2013-07-18	23:21	VE7NH	18	JT65	50	D	R-12	R-14	23:23	CN89		
2013-07-19	02:03	K7LFV	10	JT65	50	D	R-01	R-01	02:05	DN18		
2013-07-19	02:39	K4MPN	7	JT65	50	D	R-17	R-16	02:43	FM08		
2013-07-19	03:05	W0WVO	14	JT65	50	D	R-06	R-09	03:11	EM13		
2013-07-19	03:15	KK4ISJ	14	JT65	50	D	R-05	R-08	03:19	FM05		
2013-07-19	03:23	AD6ZJ	14	JT65	50	D	R-18	R-19	03:27	DM13		
2013-07-19	03:36	N4PHH	14	JT65	50	D	R-11	R-13	03:39	EM60		
2013-07-19	03:56	KB7RUQ	14	JT65	50	D	R-04	R-07	03:58	DN31		
2013-07-19	19:01	AB1J	21	JT65	50	D	R-18	R-12	19:06	FN42		
2013-07-19	23:44	K1JT	21	JT65	70	D	R-19	R-10	23:48	FN20		

Country: UNITED STATES, Cont: NA, ab1j, Callign search, P 1.8 8.5 7 10 14 18 21 24 28 50 144, CW, SSB, 81° 1437 miles, Previous contacts with the same Station, Country: 261° 23435 miles

Date	Time	Station	Frq	Mode	Pwr	Conf	Sent	Rcv	End	Name	QTH	Remarks
												QSO

Country: UNITED STATES, Cont: NA, ab1j, Callign search, P 1.8 8.5 7 10 14 18 21 24 28 50 144, CW, SSB, 81° 1437 miles, Previous contacts with the same Station, Country: 261° 23435 miles

Win-xp-sp3 [Running] - Oracle VM VirtualBox

Wide Graph

Log QSO

Click OK to confirm the following QSO:

Call	Date	Time	Mode	Band
K1JT	2013-07-20	0015	JT65	15m

Rpt Sent: -19, Rpt Rcvd: FN20, Grid: FN20, Name: [Empty]

Tx power: 50, Retain:

Comments: [Empty], Retain:

Log QSO Stop Monitor Erase Decode Enable Tx Halt Tx Tune

15m 21.076 000

2013 Jul 20 00:16:19

Tx: CQ K6AEP CM98 Rx noise: 45.2 J19+JT65 Last Tx: CQ K6AEP CM98

Generate Std Mpgs Next Now

- K1JT K6AEP CM98 Tx.1
- K1JT K6AEP -19 Tx.2
- USING UR PROG Tx.3
- K1JT K6AEP RRR Tx.4
- K1JT K6AEP 73 Tx.5
- CQ K6AEP CM98 Tx.6