KX3 SDR Review

Elecraft KX3 as SDR**Review**

February 3rd 2014

Reviewed by NI0Z

KX3

Elecraft

Retail Cost $899 - $1700 with ATU, Mic, Battery Charger and Roofing filters.

Review Type = Mid-Level

SDR Type = SDR Transceiver

Review Radio = SN in 1300s, KXFL3 Roofing Dual Bandwidth Filter, KXAT3 Internal, KXBC3 NiMH Charger MH3 Hand Microphone with UP/DN Controls, and KXPD3 Attached Precision Keyer Paddle – Original Owner owned since Aug 2012.

Review Scope

The KX3is a highly capable transceiver with a Hybrid SDR/Analog design. It's worth noting that the Elecraft KX3 is not really marketed as a traditional SDR, it much more prevalent as a portable compact HF Transceiver.

This review will look at the KX3 being used as a base station SDR. We'll look at it use with NAP3 with some detailed coverage in setting up the KX3 using NAP3.

We'll cover its usage as a unique Hybrid SDR where it can operate as a traditional transceiver and SDR in parallel.

Reviewer

NI0Z, Mark Abraham - Licensed as Extra 2011. You can read more about the reviewer's background using the link at the bottom of the review.

Ordering, Shipping & Receiving

I preordered my KX3 in advance of its market delivery date and waited in line to receive my radio. I was notified by Elecraft in e-mail that my unit was available and asked if I still wanted it shipped.

I ordered my radio with the Heil Pro headset (very nice for outdoors work) and the base KX3 with Auto Tuner and Roofing Filter installed. I have since received and installed the Battery Backup Model and the SideKick.

The radio was delivered in a double carton and extremely well packed. The photos below are a recreation of unpacking as I did not record that event when it originally occurred. Also, my KX3 at present has been fitted with the SideKick accessory and so it does not look like a standard issue KX3.

Since this review is retrospectively created I will limit the pictures to those of the carton.

Box inside box with headsset

Box inside a box

Well protected!

Notable Specs

The KX3 has a remarkable receiver currently sitting in the number 2 position on the Sherwood receiver chart.

The key features and specs for the KX3 can be viewed on the Elecraft site at the link provided. http://www.elecraft.com/KX3/kx3.htm

Radio Build

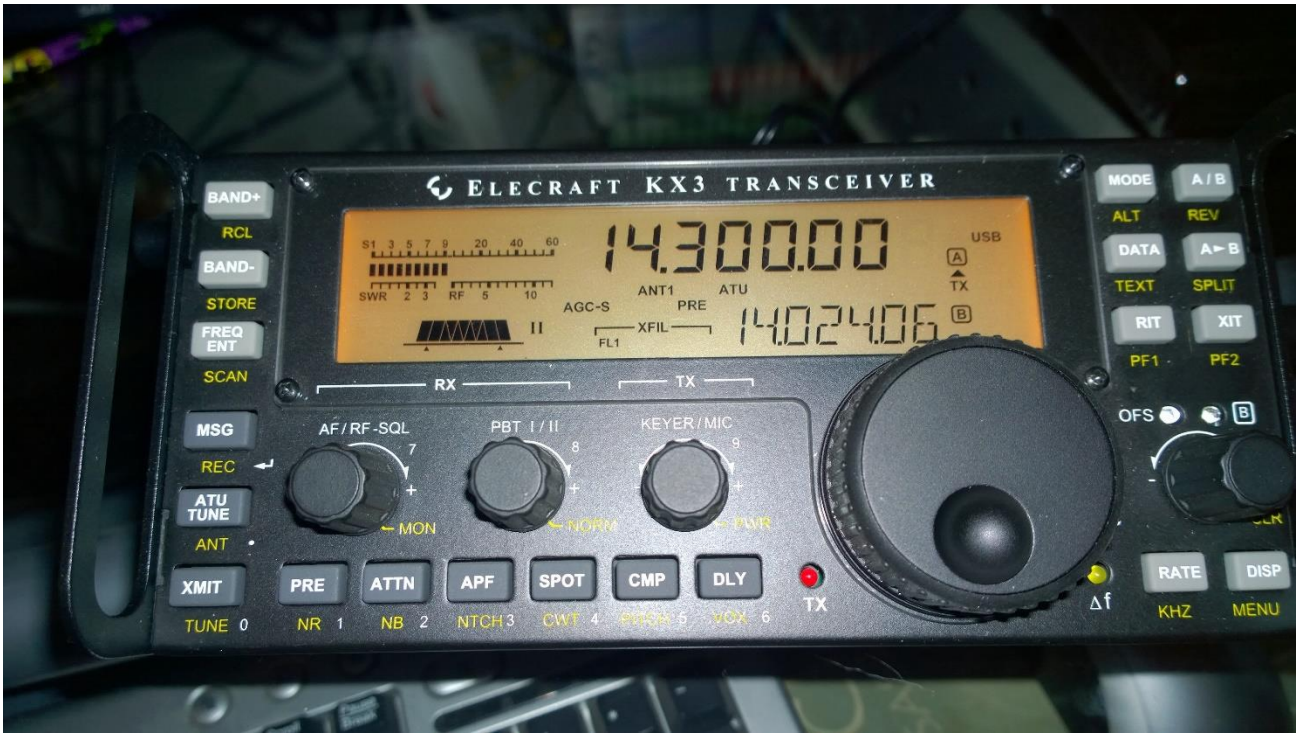
The build and finish of the radio is very impressive and sleek. The connectors are solid and the overall finish is very professional. The case is metal and very well made and there are fold down legs and external thumbscrews to open the case to access the battery compartment and or install accessories.

As you can see the operator has a nice set of controls to work with on the face of the radio. In their sum they represent pretty much a full set of physical controls with which to operate. If we think out of the standard transciever box, no other SDR has a complete set of physical controls.

Side Panel

Side panel 2 - BNC Connector for Antenna

Bottom



Front Panel Controls

KX3 with Sidekick Cover

Computer Requirements

The KX3 in itself as a portabe transceiver actually does not require a computer to operate. That said for our review you will need an entry level PC or Laptop computing device, or a tablet and compatible software to use it as an SDR. Since the KX3 outputs a standard IQ Signal, there are actually several packages one can use with it. For the purpose of this review I will mainly be referring to NAP3 with an occasional reference to Studio 1. I easily was able to work with NAP3 and the KX3 on a Macbook Pro and MS Surface Pro.

Possible Use Cases

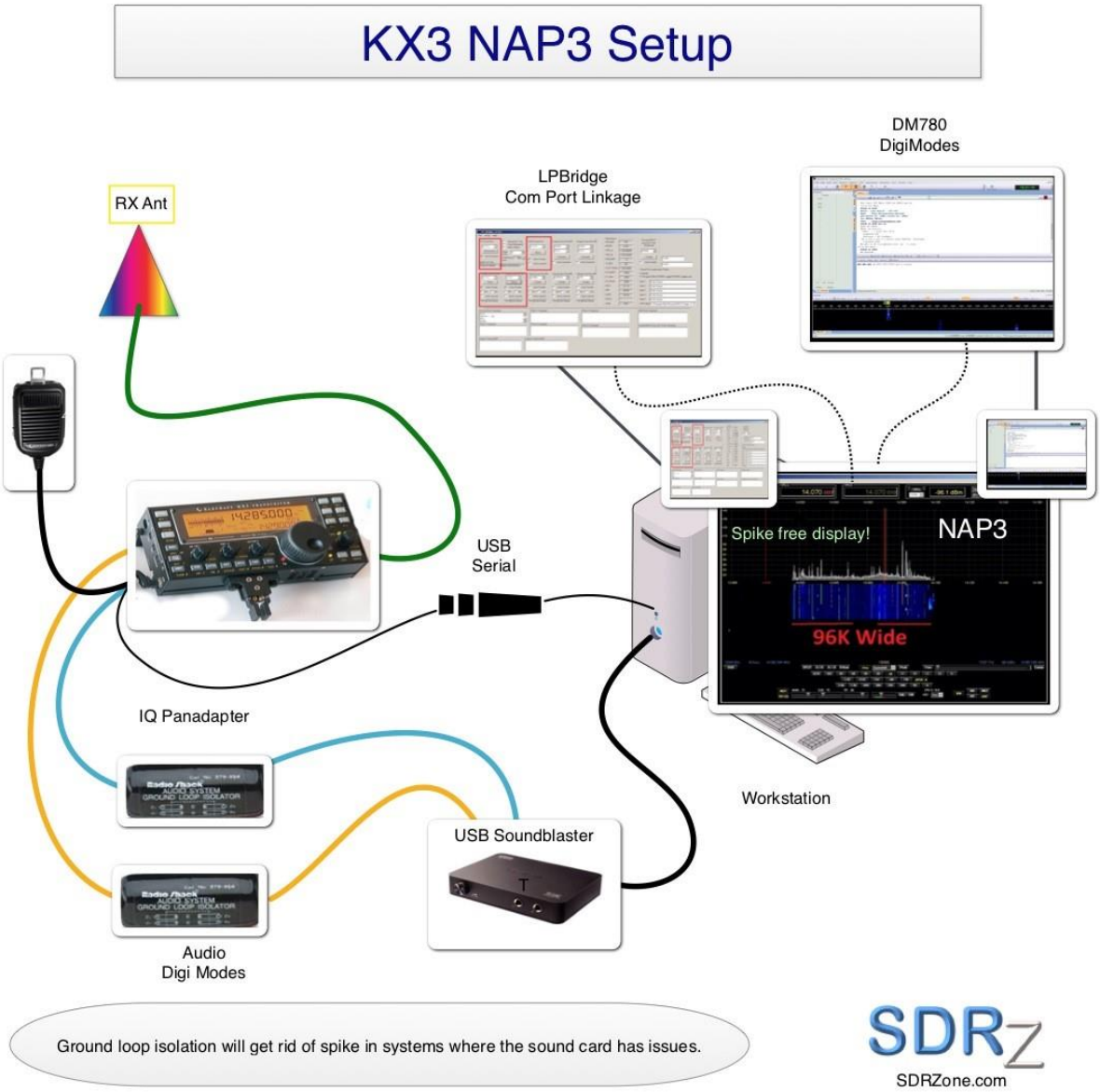
As previously referenced earlier, the KX3 is marketed as a state of the art portable HF Transceiver.

That having been said, the focus of our review is for its use as an SDR and or Hybrid Transceiver where one operates it as both an SDR and as a traditional knobbed receiver.

One could also couple the KX3 to a Tablet and use the SDR Functions available in common Tablet applications. Such as iSDR on the iPad for example using a tablet sound card and serial interface.

While less popular as a notion, one could add on an amp or amps to use the KX3 as a full blown home base station running 100 watts or more with the addition of a second amp.

The Diagram below shows a typical NAP3 setup. There are two options for digital mode operation. For VAC receive operations the second Isolator on the sound lines back to the sound card is not needed. In fact, I could see no real advantage to using the audio lines from the KX3 for decoding digital signals.

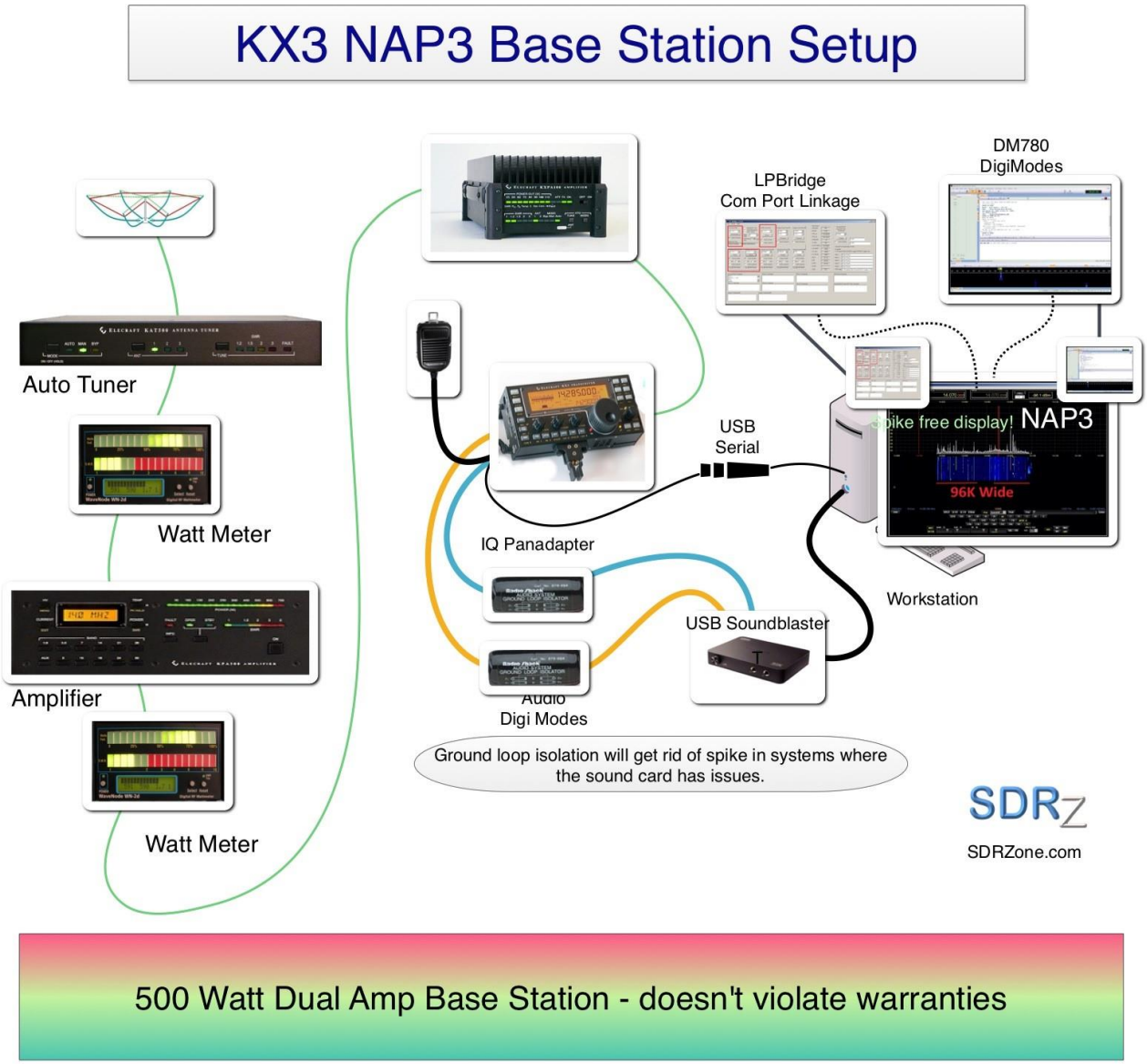


To transmit though you will need to get the signal back to the radio mic port and therefor a second isolator is recommended to prevent issues and provide a clean signal back for transmission.

The sound card and isolators used in this setup diagram links can be found in the NAP3 setup section of the review.

The diagram below reflects a full KX3 Base Station setup. The RF Watt Meter representation is optional. This setup has been discussed with Elecraft Tech Support and while one may question having to have the dual amp, this configuration will not violate your warranties on the equipment as

it does not require you to alter any of the equipment. I may move to this setup in the future, however, at present I have not tested this nor have I been able to find anyone running this configuration. I have run my KX3 with my AL811HD Amp and with 10 watts in am able to get 60-300 watts out depending on the band and tuner.



Two Radios 1 Rig

Its important to keep in mind that when you are using the KX3 natively you are using its full circuitry whereas when you use the KX3 as an SDR you are picking off the IQ before much of the rest of the radio processes the signal. You can refer to the block diagram on the elecraft site to see a visual representation of the circuitry to see this.

KX3 Block Diagram – Look at blue boxes

http://www.elecraft.com/manual/KX3%20Manual%20Block%20Diagram.pdf

In this second scenario the software then emulates the radio circuitry, filters, ect for you in lui of the hardware. Hence software defined radio.

What makes the KX3 so unique is the ability to actually use the radio both ways in parallel. It is true though that the sound coming from the software will be slightly delayed due to the latency inherit in processing IQ in a PC.

It is nice though in that if you want a Panadaptor Display you can use NAP3 for solely that purpose and leave the audio turned off. Considering this one can have a Panadaptor virtually for little additional cost. Testing showed that the SDR Software reception could not perform as well as the radio itself making this point more pertenent.

Setup as an SDR using NAP3

The following limited reference has been put together in an effort to help KX3 users be able to quickly setup NAP3 off the RX/IQ. This document also covers LP Bridge and PSK using Ham Radio Deluxe and DM780.

The reference starts off with NAP3 and then covers LP Bridge and finally DM780. It has been laid out this way to help you build connectivity and debug issues one piece at a time as not to over complicate the process of getting everything to work.

You are strongly advised to follow this approach.

I am going to make some hardware suggestions here as well and you need to know up front I in no way endorse any of these products or even this setup itself.

You should be forewarned that this setup can be unstable. Others as well as myself have observed that once you switch from CW and back to SSB for example, you will have issues and may need to quit NAP3 and relaunch it to resolve the issues.

Ok, with disclaimers out of the way there are some things I believe you need to be successful.

I believe you'll need an Isolator in most setups, or two if you want to transmit to the computer in digital modes. Radio Shack has them for $20 each on sale that has worked fine for me. I cannot guarantee you that it's perfect or that it doesn't limit the KX3 in some way. A discussion with Howard at Elecraft leads me to believe that this isolator is sufficient. http://www.radioshack.com/product/index.jsp?productId=2062214

You'll need a sound card. I am using the Sound Blaster XFi HD USB card. It supports 24 bit 192k sampling. http://tinyurl.com/9y9ho3a.This sound card actually works well with the digital modes as well.

http://www.amazon.com/Creative-Sound-Blaster-System-SB1240/dp/B004275EO4

For this SB Xfi HD sound card if you use it, you'll use the phono/line in RCA jacks on the back to run your RX/IQ for input. The above referenced isolator works well with a 3.5 to 2.5 mini jack adaptor, also available at radio shack.

The line out jack with a second isolator works well going back to the Mic input for digital modes and has been tested with DM 780. The isolator for digital is optional though as an RCA to mini jack cable works fine as well. The cable that accompanies the isolator is all you need to connect from the above soundblaster and the KX3 Mic input jack.

Of course if you prefer not to spend money on a sound card or have one already in your PC you can translate my directions to use it instead.

You'll need a way to connect to the RX I/Q port. With the above referenced hardware the only additional item you will need is a 3.5 to 2.5 stereo mini jack adaptor. The Isolator and sound card have the rest of what you need.

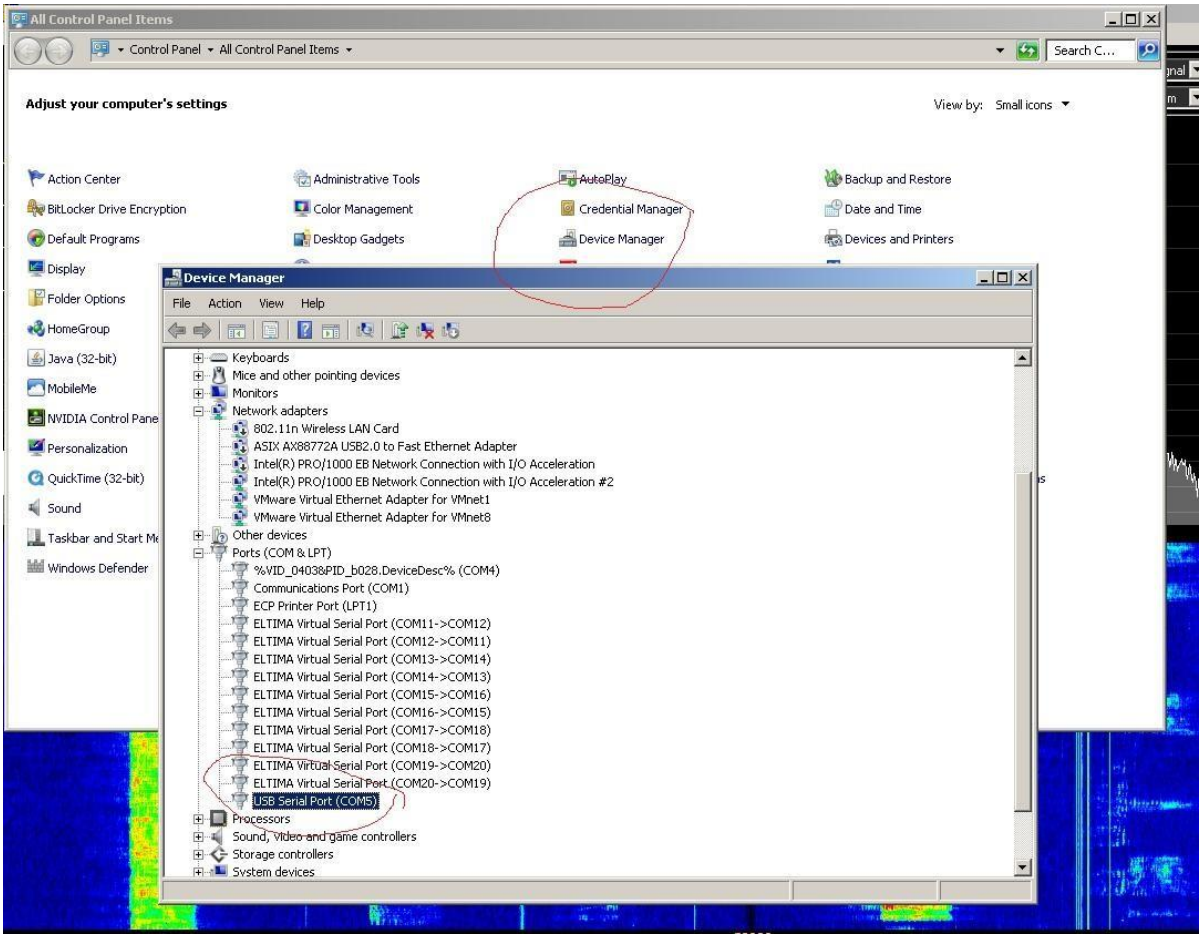
You'll need the KX3 Cat cable for full point and click Panadaptor capability.

You will need some info for this setup, here is what you need and how you get it.

You may also want to use LP Bridge so that you can use multiple CAT control software with this setup. This will accommodate logging packages such as CommCat, HRD, DM780, FLIDigi, Ect.

Com port info for Cat control

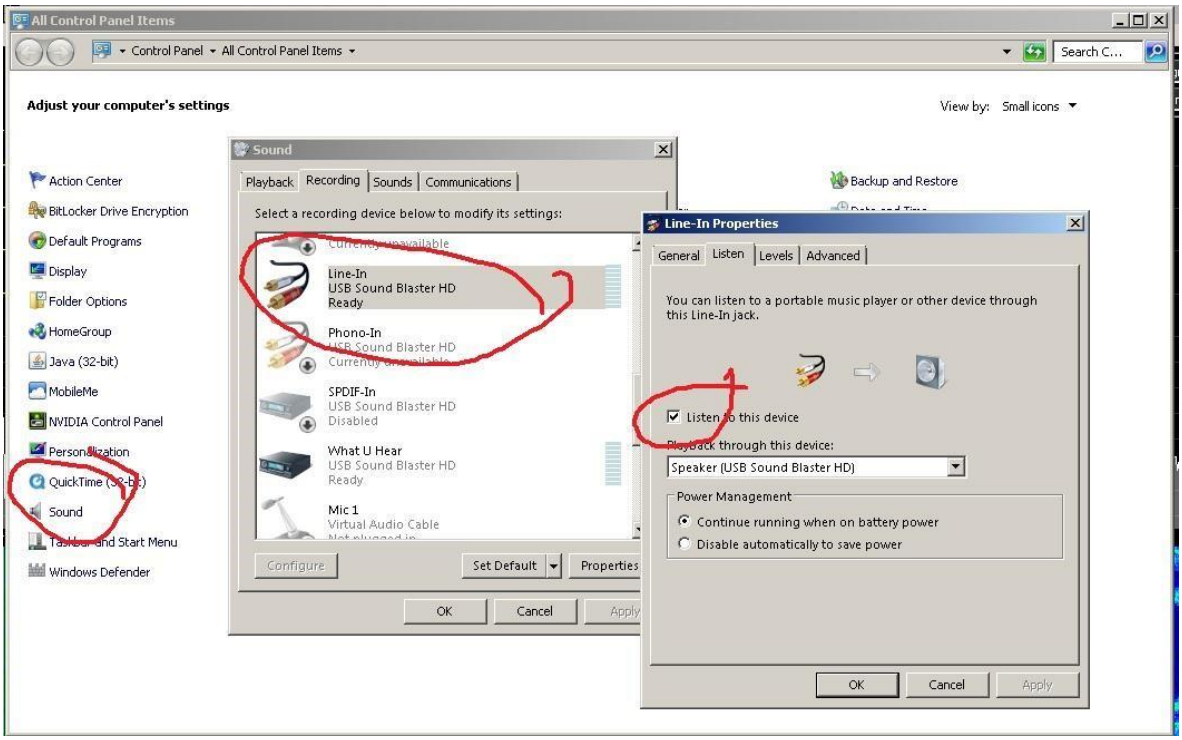
You can find the com port by going into your control panel under Device Manager and look at com ports in the list, expand it and look for the USB Comport that is added when the KX3 cable is plugged in. Write down the port.

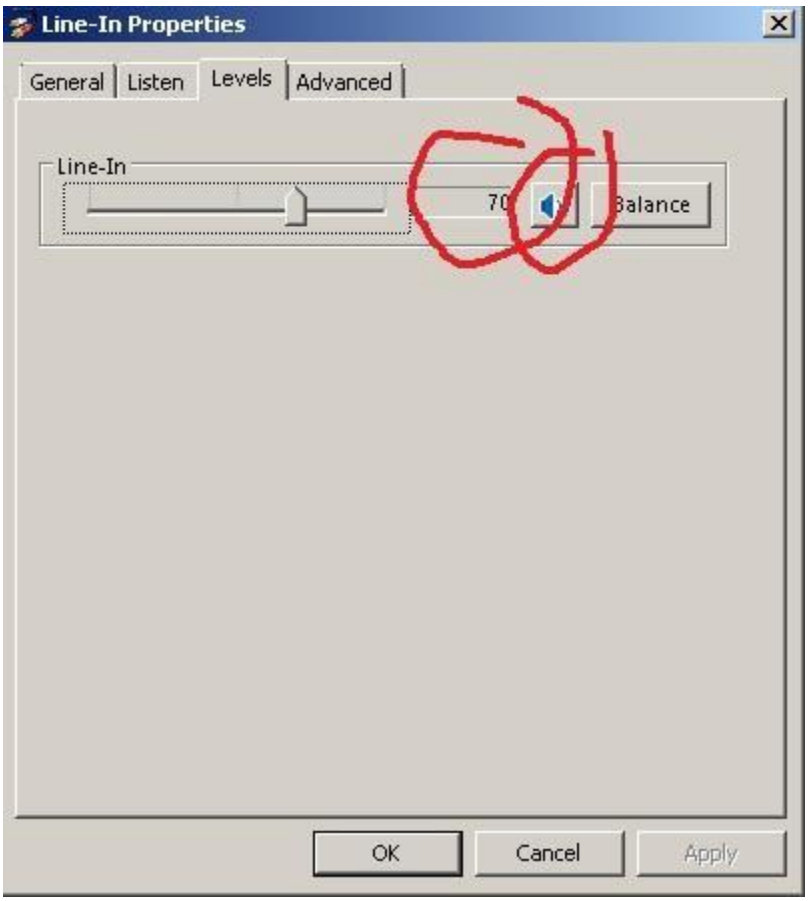


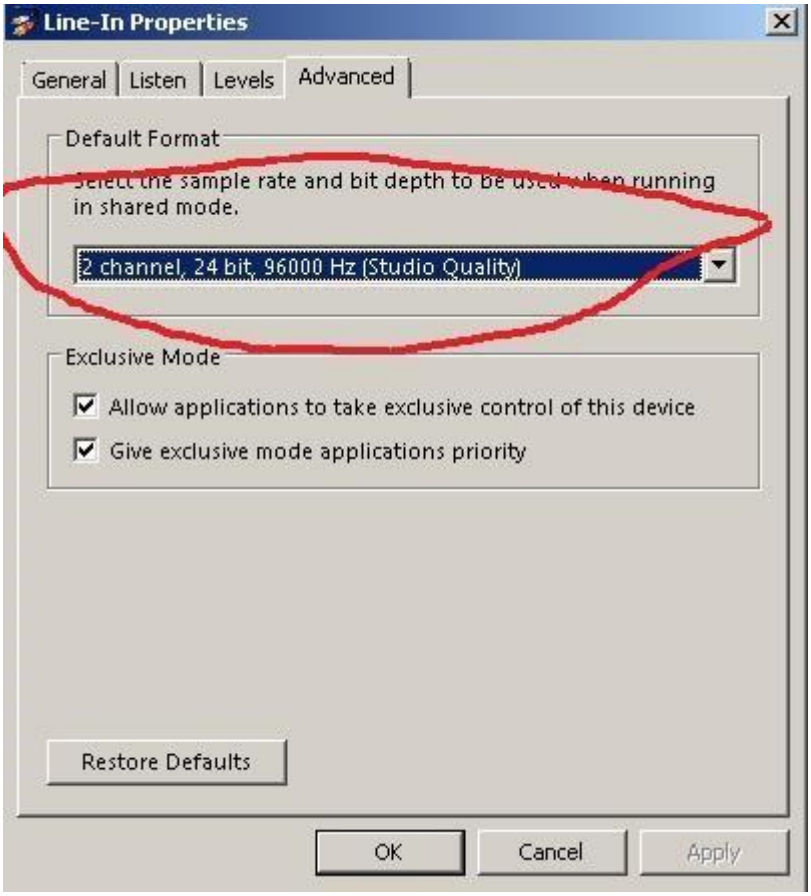
Sound card info and setup

You'll need to go into Sound under control panel and find the device you selected for input under record. Open the properties and work through the taps. Click listen on, click mute off on the next tab and also set the volume level to 70. The last tab will let you select the sample rate. Set it as high as it will go. Depending on your sound card you may not be able to support 192K at 24 bit. Some cards may only support 48000 16bit. The sound

blaster supports 192K 24 bit. If you are using the sound blaster USB I referenced above, then don't use the phono device, use the Line In device. They use the same RCA Jacks and the line in device will allow you the higher sampling rate. Write down your device name and selection on sample rate and bits.




Line-In Properties
General
Listen
Levels
Advanced
Line-In
Balance
OK
Cancel
Apply



Hardware Setup

On the KX3 go into the menu settings and ensure the serial port is on and set to 38000 baud. Make sure RX/IQ is on in the menu as well.

Optional: Enable RX Shift to 8K in the menu, you'll need to set an 8K Global offset in NAP3 if you change this setting. This may be very helpful in getting your NAP3 display to function correctly. Remember to come back to this suggestion if you encounter difficulties, especially if you are having a tuff time with the offset.

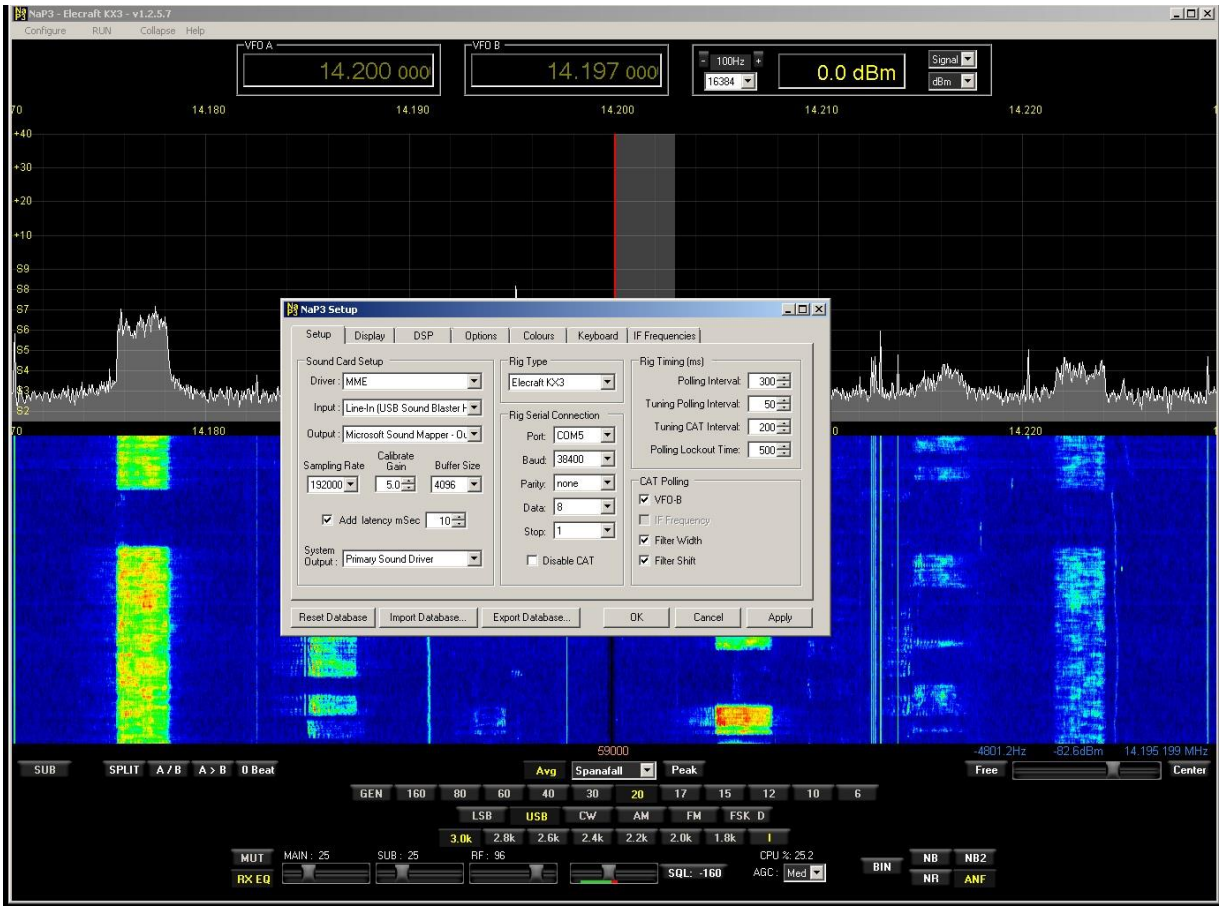
Connect a cable to the RX/IQ port. Connect the other end to an isolator. Connect the other end to the sound card. Be sure to get the 3.5 to 2.5 stereo mini jack adaptor so everything can connect. Depending on your sound card you may need an RCA to 3.5 mini jack adaptor to connect it either to your PC line in. Again, if you use the sound blaster you only need the 2.5 to 3.5 adaptor and the RCA jacks on the isolator will plug into the sound blaster USB sound card.

A SDR PC Help Guide in the SDRZone Valut accessible from the main menu will help you setup your com ports and sound cards if it's your first time.
If you prefer to use Ham Radio Deluxe you'll need to set it up using the com port info you wrote down and then start them and ensure it connect to the KX3. You may need to choose K3 for the radio in these programs as the KX3 may not appear as radio selections. So far I have not run into any issues using K3 as the radio to select for cat connections.

I reccomend using lPBridge once you have NAP3 initially working rather than going through Ham Radio Deluxe. You can also connect HRD to the radio through the addition of a com port in LPBridge for HRD to connect to.

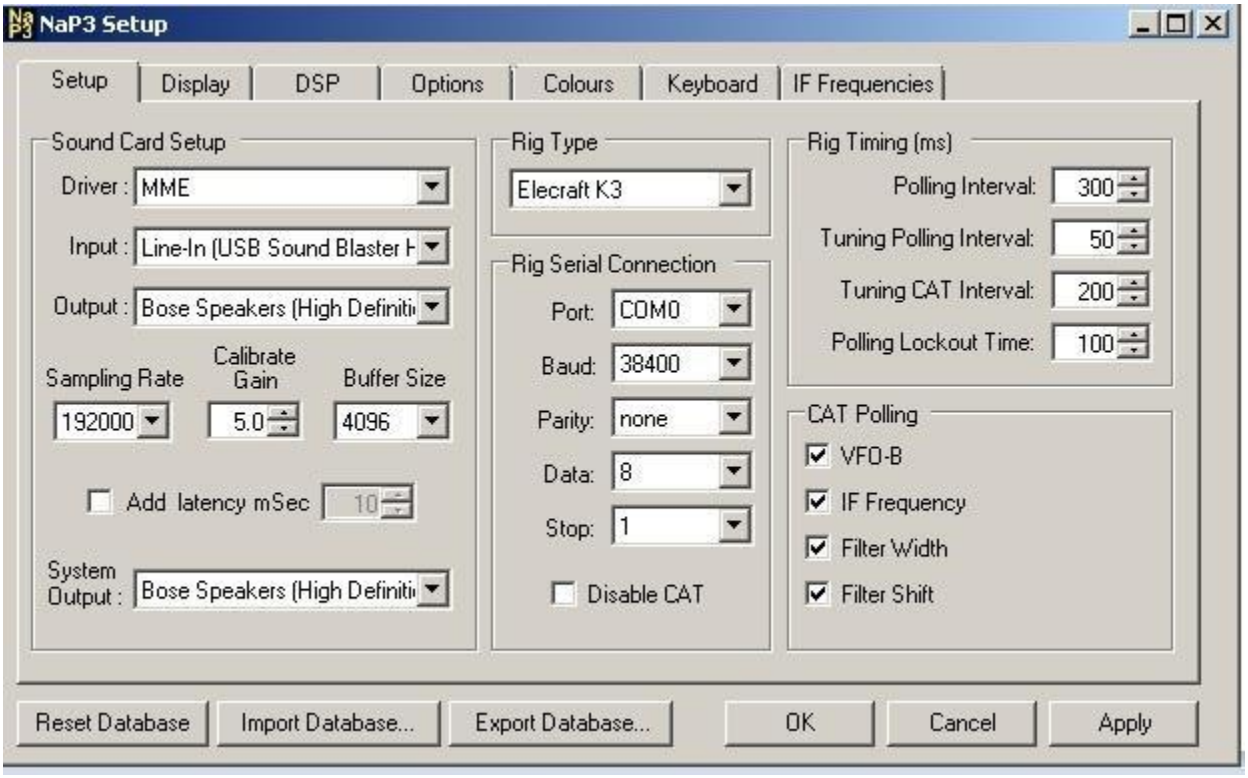
NAP3 Setup

Open NAP3 and Reset the NAP3 database. The program will close and restart. If it doesn't restart then restart it. If this is the very first time you are starting NAP3 you don't need to do this. If you have already tried to configure NAP3 and had issues, this is the best way to ensure you get a fresh start. Very few things need to be changed in NAP3 to get it to work with the KX3.



On the first tab in NAP3

- Set the top sound card setting on MME.
- Change the input to point to your soundcard line in where the RX/IQ is connected and that you configured above. In my case I use the sound blaster Xfi HD for the input.
- Output on both just needs to be your normal speakers. These are the next two pull downs. Note, you can also point these to a virtual audio cable if you like for use in digital modes.
- Set the Cat Control to either connect direct to the KX3 or to ham radio deluxe using the com port settings you wrote down. I recommend you use K3 as the radio for right now. A Digital Modes Guide in the SDRZone Vault accessible from the main menu will help you setup VAC if its your first time.

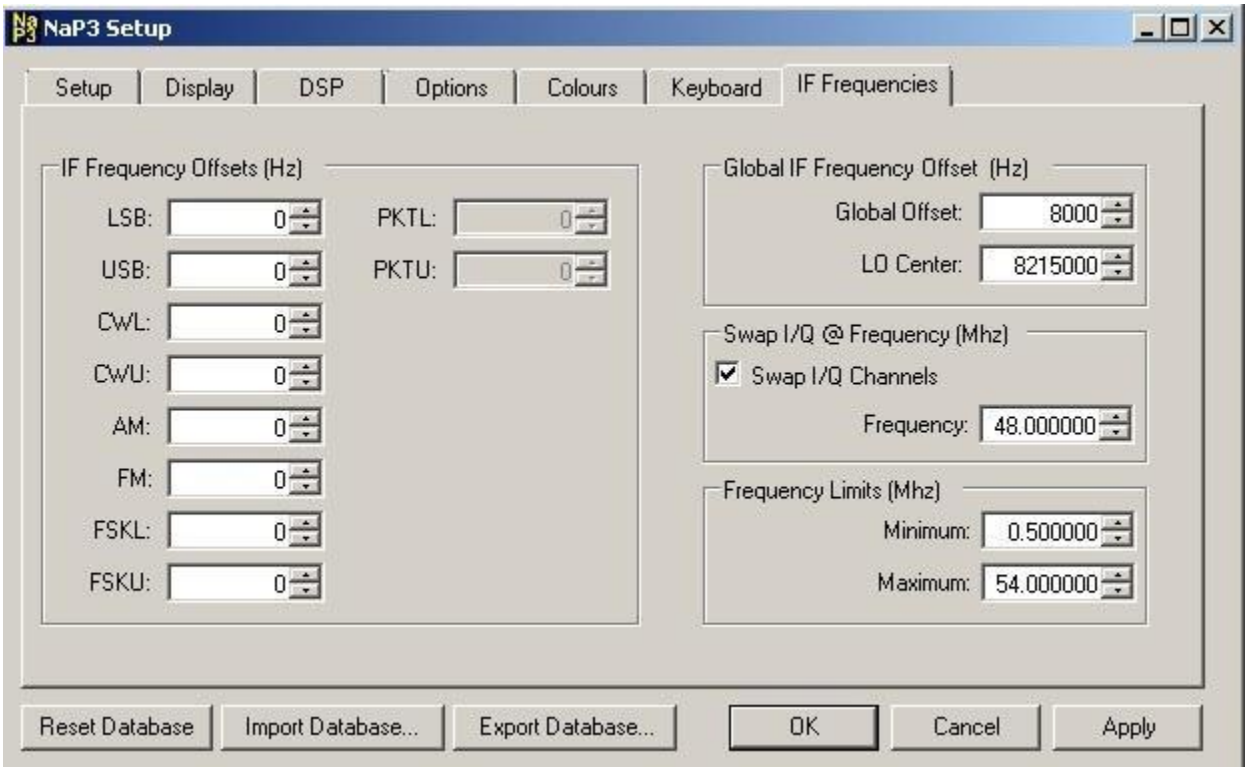


The delay on the first tab needs to be set at 10ms delay. Close settings and click start in the menu.

If you just see a large spike in NAP3 then you need an isolator or need to check your IQ connections to the PC. In my case the radioshack isolator cured this.

If things look or sound choppy go in and start changing the delay until things sound right and the display looks right. You may have to go one click at a time and if going up doesn't work try going down. You need to give each change second to take effect. You can hit the Apply button in the bottom right corner if you feel the changes are not taking effect.

In the last Tab IF Frequencies you'll want to set an 8K Global Offset. See screenshot below.

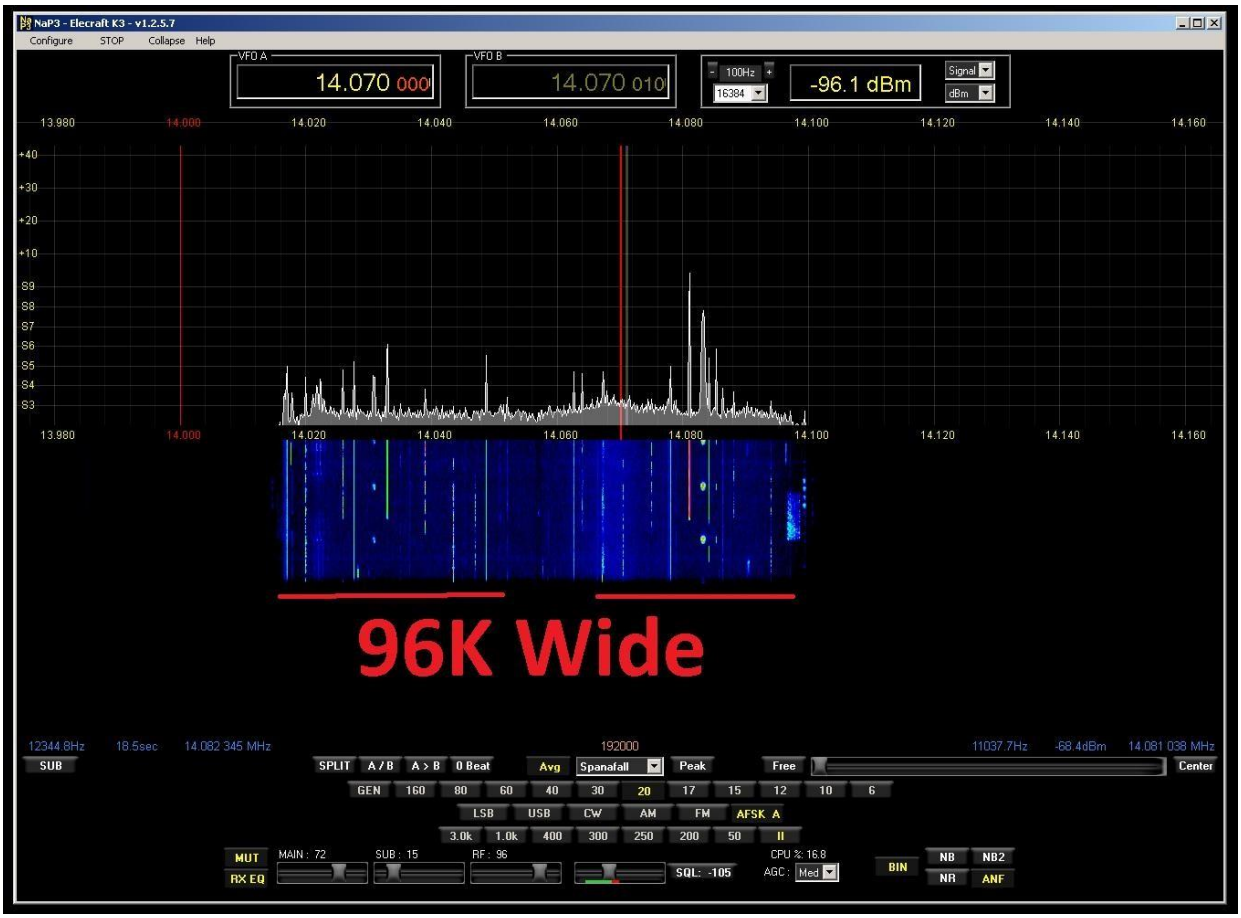


Note, sometimes not all options will be available for change. I have not figured out why this does this yet. The important thing right now is to get the Global offset to 8000 if you set the KX3 RX Shift to on in the KX3 menus. As referenced this is optional. You may find that coming back to this screen in later sessions will enable you to change these settings.

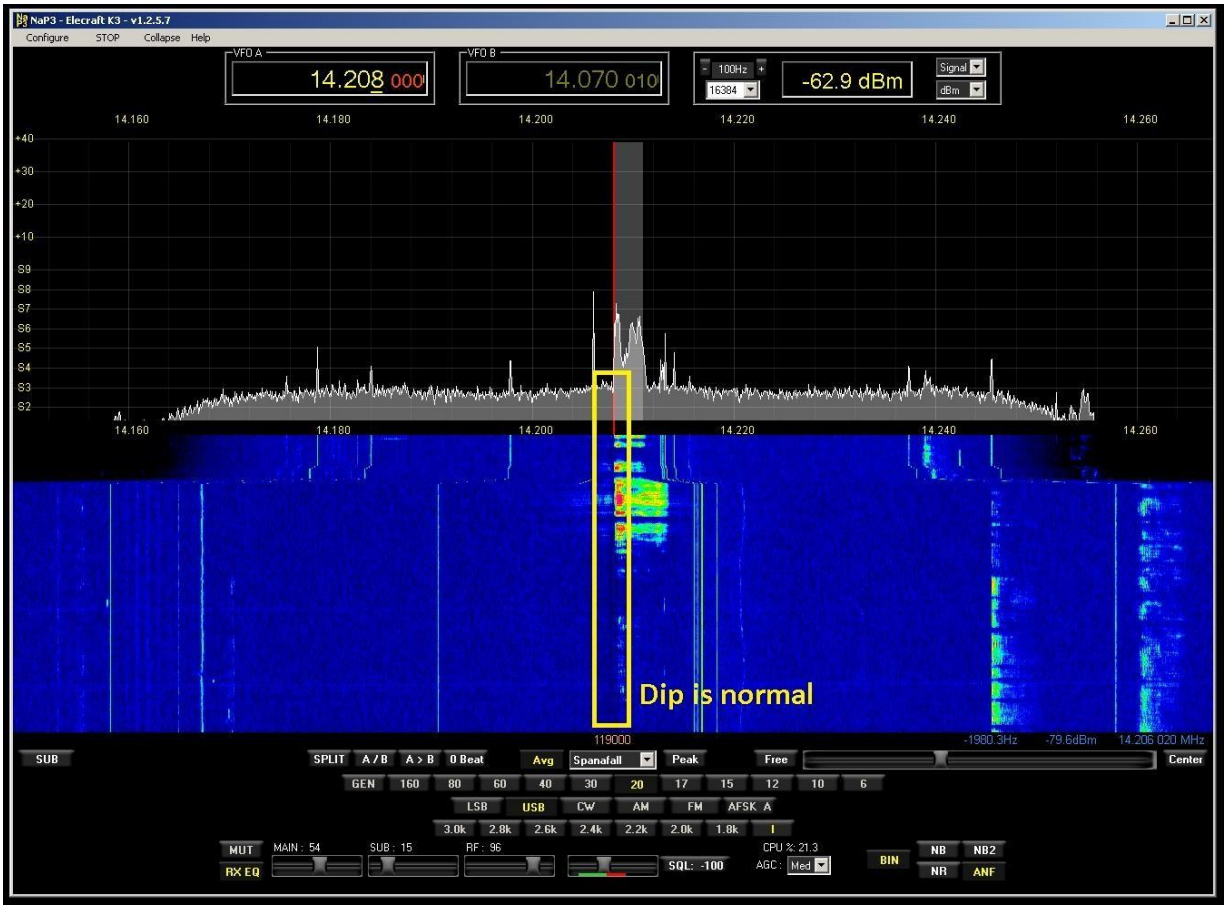
This should work, I didn't need to change anything else for the KX3 to work.

You're now ready to run NAP3, you should see 96K of bandwidth if you opted for 192K in your settings. This more or less confirms that at a minimum the radioshack isolator works. I can not vouch that it does not hurt performance in some way. Given the fact that it would appear at times I hear weaker signals in NAP3 than through the KX3 I would say its adequate.

You can use the scroll bar in the bottom right side to adjust the spectrum display width to the level that is comfortable to your liking. I generally widen it to where the slopes on the sides disappear.



Note, the off center look to this display is due to the RX Shift being set to 8K in the menu options. if you can get everything to work without the shift (I have in the past) then you will have a more pleasant user experience. I have to laugh because there is some insanity to the offset, it seems to change like the whether. At present I find that with RX Shift Off I need a negative 5000 Offset and all works well. The screenshot below shows how this differs. You may notice a dip at center frequency, I have read this is normal for soundcard based SDRs so do not worry about this.



Warning

The global offset seems to shift from time to time. The exact reason for this is not known at this time other than changing to CW mode (common for tuning up your Amp or for working CW) will cause everything to seriously get out of whack.

Setting your Cat control to K3 in NAP3 verses KX3 seems to help. Starting NAP3 after LP Bridge is running and having your KX3 already tuned into a strong station will greatly help.

If you start NAP3 and see a hot signal dead center and it moves where ever you click then you have either an RFI issues or a ground issue. For example, the fans on my laptop cooler cause this. I also have this issue without an isolator.

One way you can matchup the receive and transmit frequencies is to find a strong conversation taking place on a frequency through the radio speaker and then see if you can see how far off you are on the NAP3 by writing the radios frequency and then seeing what the frequency is in NAP3 when you find the same conversation. The difference between the two is your offset and needs to be entered into NAP3 as a negative or positive number depending on the nature of the variance.

Fast Hints in NAP3.

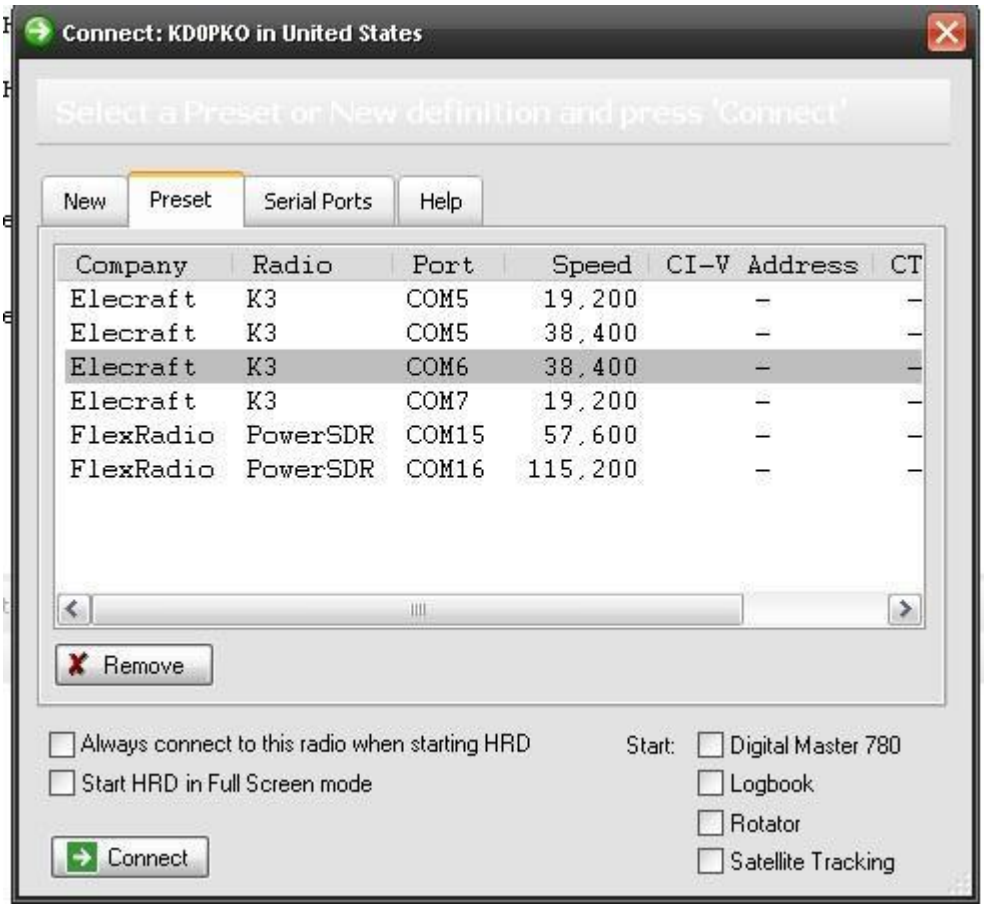
If you hover over the Avg button you can change the color of the waterfall and the base level that the signals display by using the scroll feature on your mouse. Right Clicking while using the scroll wheel on the mouse will raise and lower the base line. You'll also notice the color of the waterfall change as you do this. I keep my base close to the bottom.

You can also choose different skins in the setup tabs on NAP3.

At present I have a transmit issue where my sound on Xmit comes through NAP3 for a few seconds before going away. Also, I am using speakers on the KX3 for sound and muting NAP3 until I figure it out. Using a quality set of speakers directly on the KX3 will likely yield the best results for receive.

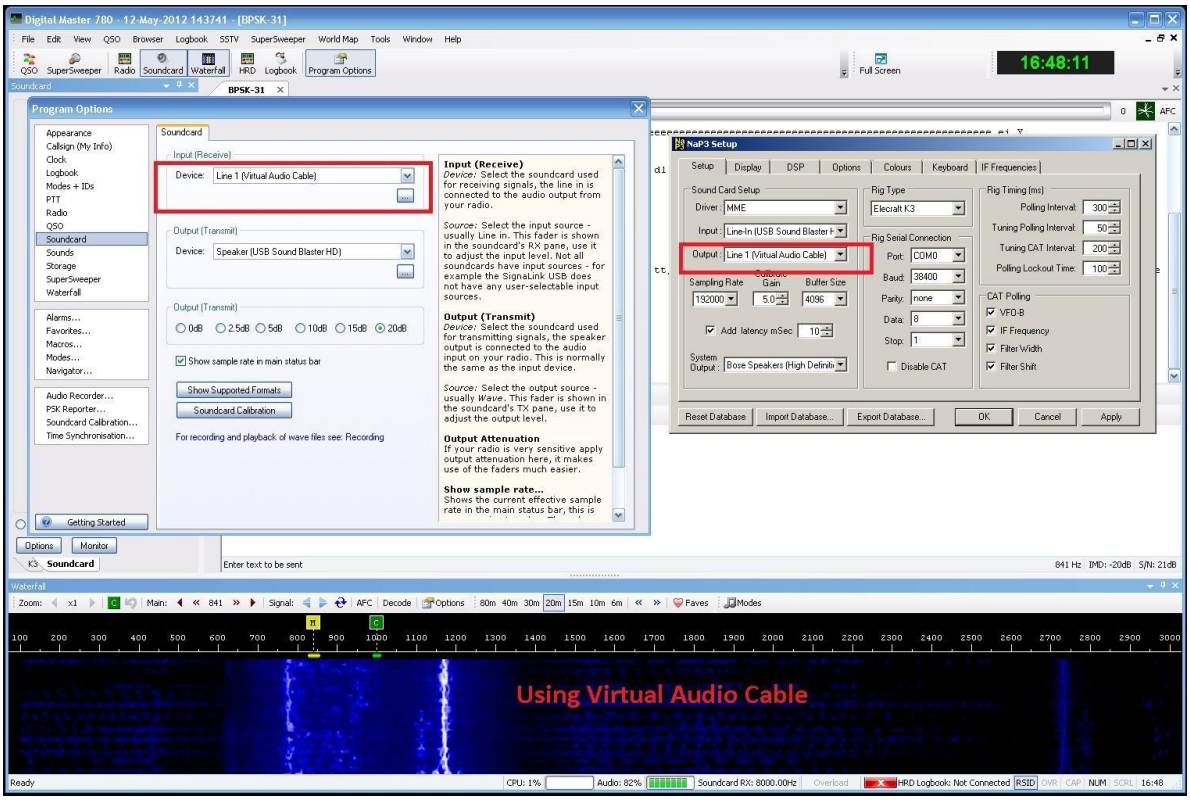
HRD & DM780

Using the Com Port you created in LPBridge you will setup Ham Radio Deluxe to connect to your radio.



To use digital modes in HRD there are two ways you can choose to go for your audio out of the radio and into the computer for receive in DM780.

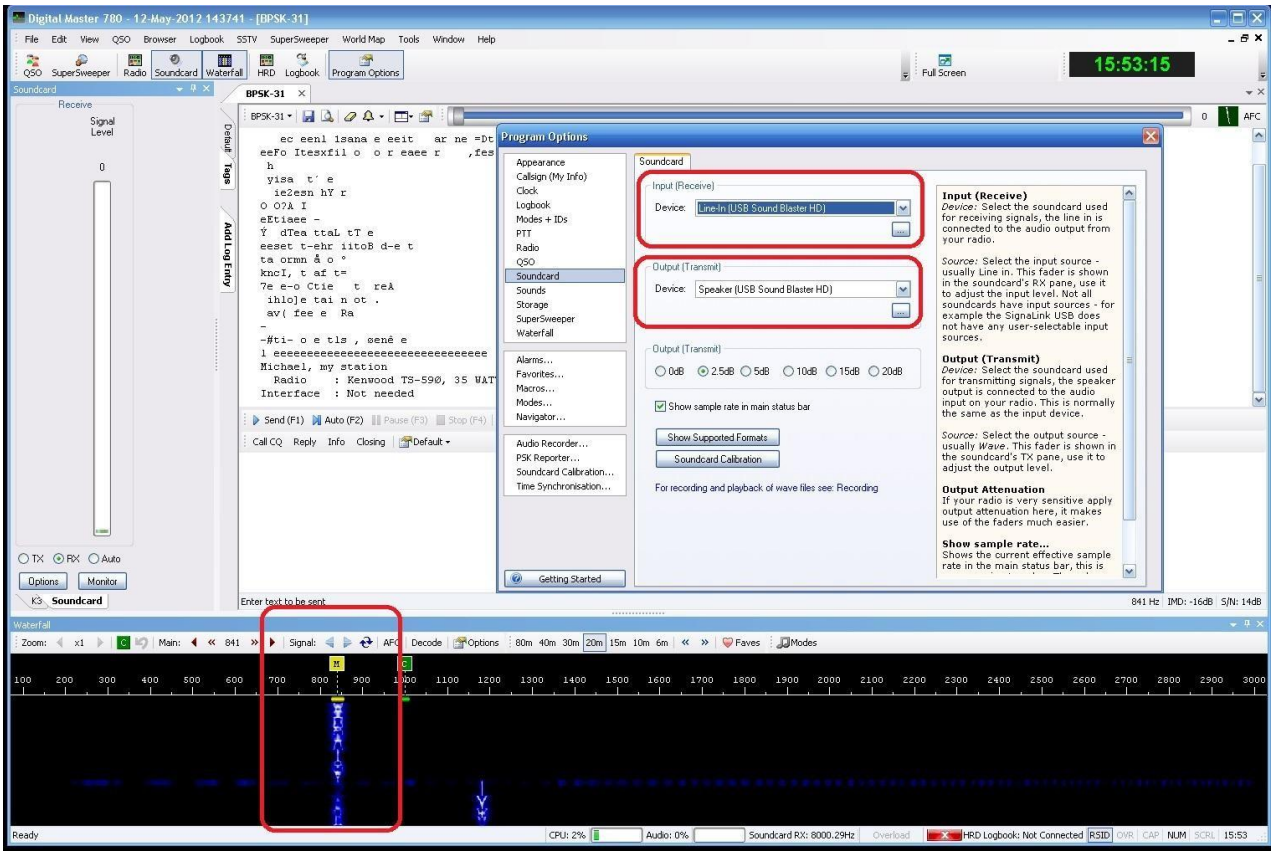
You can connect a direct cable from your sound card line in to your phones jack on the KX3, or you can create a virtual audio cable, just google the program and download it and follow the instructions. Once you have it you can set the output in NAP3 to Virtual audio cable one. Then you can select that as the input in DM780. This will direct your sound output to the virtual audio cable so you'll lose sound from NAP3 if you do it this way. See the screen shot below for the setup outlined in red, note that you must change NAP3 as well to point its output to the Virtual Audio cable (VAC).



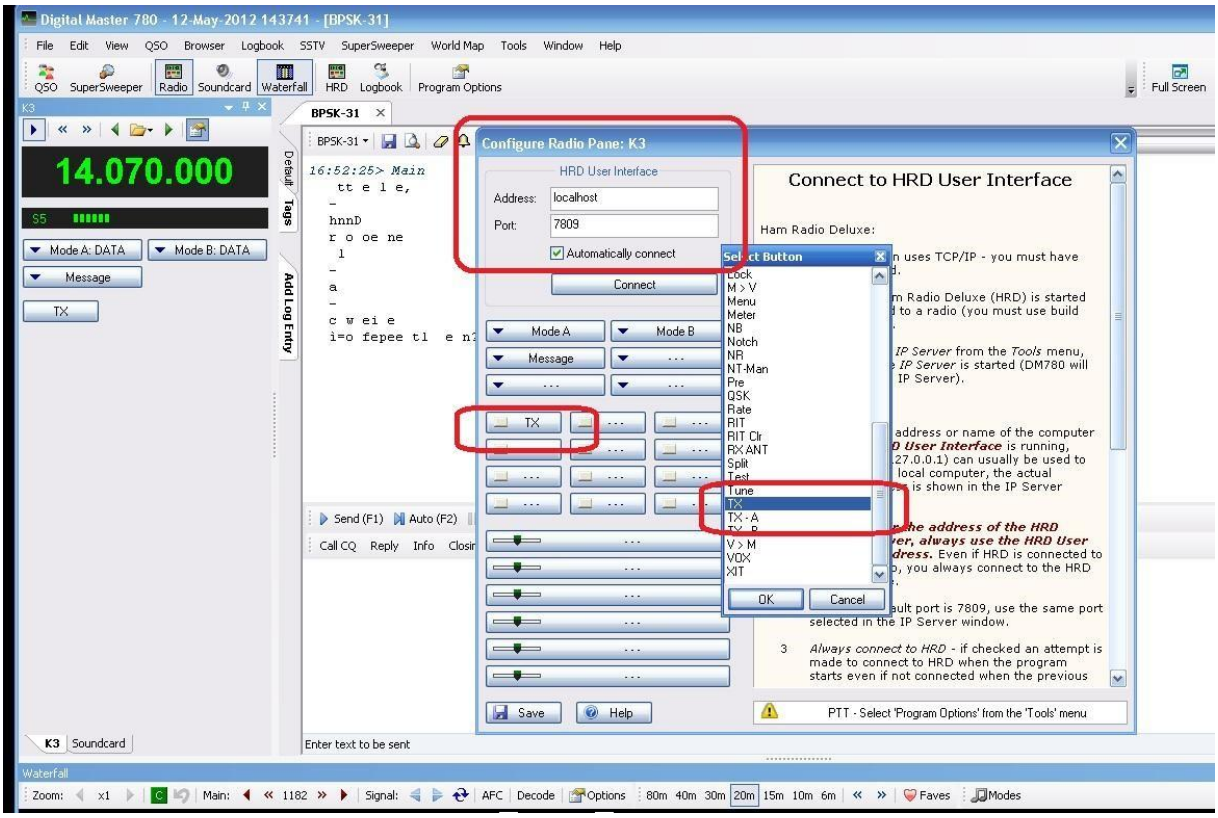
For transmit on the SoundBlaster I use the RCA output jacks to the mic input on the KX3. Using an isolator will help protect your radio. You can use your line out jack on the PC if you are not using the sound blaster USB to the Mic in jack on the KX3.

In DM780 you'll choose the sound blaster speaker for the output. In similar fashion above you'll need to make sure it's enabled in the control panel as you did above for the line in.

Remember earlier we said you'll select either your line out or your virtual audio cable for receive. Yes, this is using the same input for the RX/IQ. I am surprised this works, however it does. Alternately if you prefer you could run a line form the phones jack on the radio to an input on your sound card and use that.



In DM780 you'll need to assign the Xmit in DM780 to the TX button. It will give you an option and this way when you transmit the CAT control will key the rig to transmit and also stop transmit when it's sees <STOP>

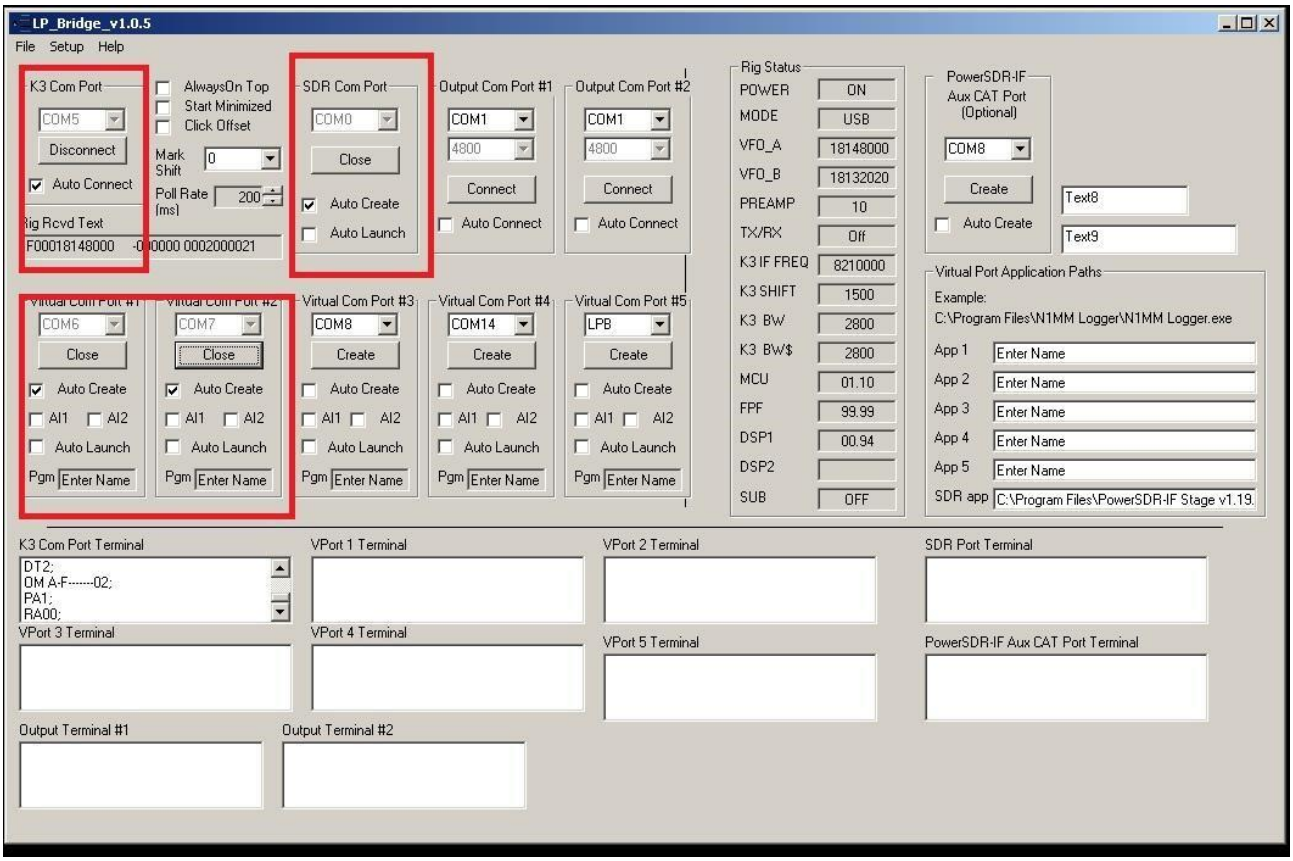


LP BRIDGE

LP Bridge is very easy to setup. Google it until you get to its homepage. There you'll find the full install package and then the update package. Install the full package first, then the upgrade afterwards.

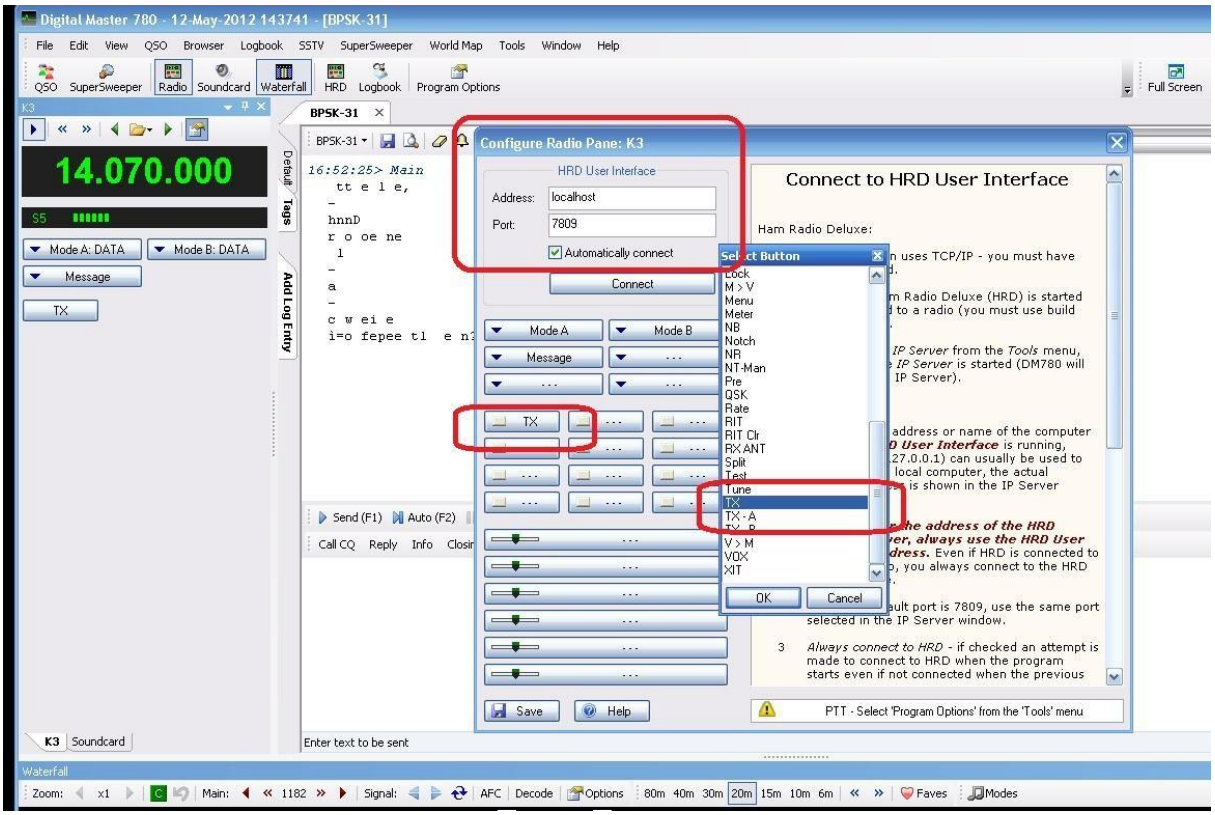
Once it's installed you'll connect LP Bridge to the radios com port in the top left corner.

Next create an SDR connection just to the right. The port you create cannot be a port already assigned or in use by another program. Port 0 or Port 99 makes good choices for this. This will be the port you cannot select in NAP3.

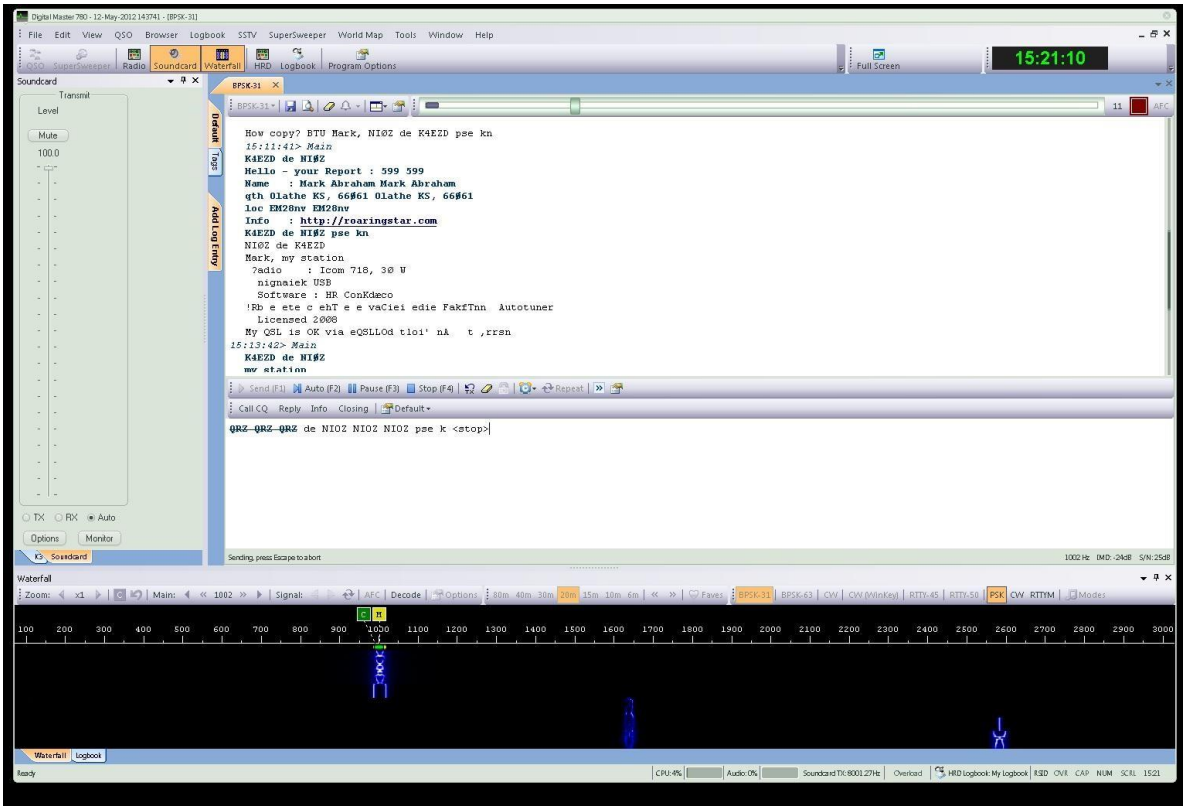


Finally, in the middle section of the LP Bridge screen you'll create additional com ports, as many needed for as many programs you plan to connect. Do not create more than you need though and remember, they can't already be used ones. Usually 6&7 should be available. Remember in all this your KX3 has a max baud rate of 38000. The bands in all your programs when setting up in them need to all match 38k, N, 1.

Once you have connected LP Bridge to your KX3 and turned on the virtual com ports you have created and see them working you can minimize (don't close) LP Bridge and open up NAP3 and connect to the SDR com port you created. Next you can open up Ham Radio Deluxe and connect to the virtual com 6 or 7 you created. From there you can open DM780 and connect to Ham Radio Deluxe. Now your ready to try digital. I fine that 14.170 on 20M is usually active and a great place to test.



Find a blank spot on the waterfall and try CQ. See if the TX red lights up on the KX3 while transmitting your CQ. If it doesn't then you need to set your TX to the TX button in options. After a few CQs you may get a response. If not then try making a contact with someone calling CQ.



Here is a short video on YouTube showing PSK31 running with NAP3, Ham Radio Deluxe, HRD Logger, and HRD DM780 all connected by LP Bridge.

http://youtu.be/QaurKGrGzek

One last note, if you want to use the KX3 for serious digital mode operation, Elecraft offers a calibration service now to greatly reduce drift by sending your radio back to them. The service appears to cost $115 plus shipping and another $40 if you want express service. I have not used this service so I cannot comment on the extent to which it addresses the issue.

Resuming Review Here

Operation

The KX3 in my limited experience is an exceptional transceiver! I have used it as the receiver to compare my other receivers and I have not found one that hands down beats it in my unscientific tests I have conducted.

The controls and menus are fairly easy to adjust to and then master. The documentation available for the KX3 is robust and well written making it easy to go through all the controls and understand their functions.

Having primarily used SDRs since becoming a ham it was interesting to go back to a physical control paradigm, however, the Elecraft menu system is an intuitive one making that a nonevent.

SW AM

The KX3 will work fairly well as a shortwave receiver. The only exception is below 1500khz where the architecture limits its capabilities as an SWL radio. It should be noted that one may still be able to listen to stations below 1500khz, just with some performance limits.

One other notable limitation is that using the radio natively you are limited to 4.2K wide reception settings which is not much considering some of the stronger bigger stations operate as wide as 20K thus impacting ones ability to hear stations in their fully glory. As an SDR the KX3 does not have this limitation as you are only limited by the IQ bandwidth so in NAP3, HPSDR or Studio 1 you can listen to those stations like they were meant to be heard.

As an SDR though the radio seems much noisier.

It should be noted in attenuation testing the KX3 on Shortwave bands the KX3 appeared to have 10-15 less db of a signal as opposed to an Anan 100D without even applying any attenuation.

My only guess here is either my faulty testing or that the signal reception is more optimized for ham bands as opposed to SWL.

SSB

The SSB sound for both upper and lower sideband is quite excellent. I noticed a small difference between the KX3 and the WiNRADiO g33DDC

with the Excalibur seemingly a smidgen quieter as a receiver in the shortwave bands and a little noisier in the Ham Bands.

The KX3 does have some tuning artifacts when changing frequencies, nothing really worth worrying about.

Using a set of high quality speakers verses the built speaker is highly recommended if you are working weak DX's.

Also the Heil Headset Pro works wonderfully with the KX3 for outdoor operations.

In a side by side comparison using a variable attenuator it appeared that the KX3 as a normal transceiver outperformed the Anan 100D by 2-4db in receiving a weak attenuated signal. Note, this is listening to the audio through an attached set of speakers verses the Anan using a much better set of speakers connected to the PC on a high end soundblaster card. Inputting a very strong signal in the attenuation test resulted with the Anan 100D being able to tolerate 20-30DB more attenuation before losing the signal. This was a very unscientific test and interesting to observe.

While as a normal radio it outperformed the Anan, as an SDR using NAP3 and Studio 1 it would appear that the Anan 100D outperformed the KX3 by 6-10DB.

I hope with the addition of a bitscope I will be able to improve my ability to measure the differences more visually instead of relying on my ears by looking at the audio on a scope side by side.

Testing Considerations

I used Studio 1 which is using a Beta dll

RXIQ output on the KX3 runs through an Isolator and might impact performance of IQ

Ears verses a scope was used to measure db difference

The Preamp on the KX3 was on.

Testing process is very very new!

CW & PSK31

While I am not a CW Op I do listen and decode quite a bit of it using DM780 and spend time monitoring it frequently in testing radios. There were clearly times when it received signals that the Excalibur, Anan, QS1R and other radio I tested did not seem to pick them up and then a few times visa versa.

I was lucky a few times and happened to catch some weak signals by accident that failed to be seen visually on either the panadaptor or waterfall displays.

Overall the KX3 unscientifically has seemed to have an edge more consistently than others.

I should note this was with the PreAmp on and having a preamp built in is definitely nice and an add-on for many other SDRs. When piping signals to DM780 it was difficult to see any differences.

The KX3 being a Hybrid offers two different ways of approaching Digital Modes, one being through VAC out of NAP3 or Studio 1 or directly using the audio lines from the radio to the PC.

It would appear in some cases that the direct audio lines did not perform quite as well as the VAC lines while in other instances it clearly leaned the other way.

It should be noted though that the KX3 would experience frequency drift sometimes while in the digital modes which was visibly evident in DM780. For a fee and shipping costs you can send your KX3 back to Elecraft where they can perform a calibration procedure that is claimed to greatly reduce this. One can also perform this procedure themselves if they have the right equipment and know how.

http://www.elecraft.com/manual/KX3%20Custom%20VFO%20TC%20rev%20A9.pdf

Notch Filters

While the KX3 has filters, as far as using it as an SDR you would rely on whether the software has notch filter support. NAP3 for example does not and if your using it as a Panadaptor it would not really be applicable since you would probably be using the radios filters. The Preamp interestingly does seem to effect the RXIQ output.

Studio 1 on the other hand offers notch filters in software as well as sporting a really awesome receiver that I found was able to match the KX3's native performance. CAT support however for the Studio 1 doesn't yet properly support radios like the KX3. Also, Studio 1 as of this writing still lacks transmit capabilities. The developer of Studio 1 has stated that he is working on transmit capabilities for a future release as well as addressing the Cat syncing functions which would allow Click Tuning with a transceiver like the KX3.

Platform Support

The KX3 has software support for most platforms and will even work with the iPad with the proper adaptors. Pignology makes a nice solution for using your KX3 with the iPad for logging. The addition of a sound card for your iPad will allow control with iSDR as well.

Other Software

Basically any software that supports IQ input via a soundcard and supports CAT control should work with the KX3 and offers a level of operating system and platform autonomy.

Network Access

There is not a direct Ethernet port on the KX3

Reviewer Notes

The radio is really very nice! Originally I expected it to be smaller than it was, however, its not overly large either.

This Hybrid SDR can virtually operate anywhere as far as I can see. There have been no heat issues at all operating under 10 watts.

I feel like the KX3 is the swiss army knife of Ham Radios capable of being so many things to so many different ham radio operators.

The KX3 is a joy to use both at the base station as well as portable. See pictures below of outdoor ops with a buddipole!

The KX3 is nicely expandable with, Autotuner, Roofing Filters, CW Paddle, Mobile Mounts, Battery Backed Clock and Battery Recharging board, and an Amp for 100 Watt ops and a future 2M module on the way.

Menus are nicely organized, easy to use and packed full of features making the radio highly adaptable.

The only knocks I have are the internal speaker buzz (appears to be an audio processing artifact as it can also make external speakers buzz at higher volumes) and the Frequency Drift which can be addressed by sending your radio back to Elecraft for a fee for a calibration procedure or calibrated by you yourself with the proper signal generator.

Documentation for this radio is simply awesome! The manuals provided as well as third party offerings are exceptional.

Scoring as a Standard Transceiver & then as SDR

KX3 Rating as normal Transciever

Criteria	*Score 1-10 - 10 is high	Weighting	Weighted Score	Notes
Order/Ship	10	0.07	0.7	Good Communication and Packaging
Build Quality	9	0.12	1.1	Very Professional Build, some parts come loose too easily, overall though, very solid.
Design Quality	9	0.12	1.1	Very Clever Design, Highly Versatil!
Ease of Setup	9	0.06	0.5	Was very easy to setup
Documentation	10	0.05	0.5	Easy to locate and follow, simple effective, lots of supplemental info available.
Expandability	10	0.10	1.0	There is lots of room to add on and experiment
Operating Experience	10	0.10	1.0	Dual paradigmn as knobbed receiver as well as an SDR.
Performance	9	0.15	1.4	Very clean receive audio, execeptional on weak sigs, decent transmit audio
Support	10	0.08	0.8	Professional Support System
Value	10	0.15	1.5	Cost as compared to specs and other SDRs
	96			
Overall Score (Average)	**9.6**	**1.0**	**9.6**	**Excellent**

KX3 as SDR

Criteria	*Score 1-10 - 10 is high	Weighting	Weighted Score	Notes
Order/Ship	10	0.07	0.7	Good Communication and Packaging
Build Quality	9	0.12	1.1	Very Professional Build, some parts come loose too easily, overall though, very solid.
Design Quality	9	0.12	1.1	Very Clever Design, Highly Versatil!
Ease of Setup	8	0.06	0.5	Was very easy to setup
Documentation	8	0.05	0.4	Easy to locate and follow, simple effective, lots of supplemental info available.
Expandability	9	0.10	0.9	There is lots of room to add on and experiment
Operating Experience	9	0.10	0.9	Dual paradigmn as knobbed receiver as well as an SDR. Ideally use IQ Panodaptor only.
Performance	9	0.15	1.4	IQ processed vary's from SDR software package.
Support	8.5	0.08	0.7	Formally there really isn't support as SDR
Value	10	0.15	1.5	Cost as compared to specs and other SDRs
	89.5			
Overall Score (Average)	**8.95**	**1.0**	**9.1**	**Very good!**

8-10 = best in class, 5-7 Above Average, 3-4 Below Average, 2 Poor, 0-1 Unacceptable

The KX3 received my highest ranking when rated as a transceiver as compared to other SDR radios. This is debatable depending on the end users point of view.

As a straight SDR only it scored lower (see second scoring table) as really there is no specific software offering yet for it. At some point though Studio 1 if it gets full transmit support would make a very nice pairing with the KX3 as an SDR. As an SDR Receiver, even with NAP3 it would rate pretty high. The score assumes hybrid operation, listening through the radios full curcuitry and using the IQ signals for display purposes and click tunning only in a base station operating mode. Note, this does not consider the limited transmit power and assumes one will use an amp in non low power operations.

What makes the KX3 so special though is that it's not just an SDR, one also gets a full portable transceiver which is highly expandable and extremely well documented and supported. Customer service has been exceptional as well.

The fact that the base unit is only $899 makes it a very attractive option, especially considering one can add an amp later on and as well as other add-ons to basically have a fully functional knobbed 100watt transceiver. This radio is a great entry point into both HF Ham Radio as well as into SDRs.

Pros

- Exceptional Receiver Performance!
- Nice looking modern portable rig
- Hybrid capability as knobbed transceiver and SDR
- Fast Excellent Support
- Organizational Integrity
- Basically useable any time any where
- Software updateable

Cons

- Is not supported by SDR-Radio or other Software
- HF Frequency Drift in Digital Modes (Self calibrate or $115 for service to address)
- Lower Power
- Speaker Buzz

Summary

I really like my KX3. It challenges me often to add the amp and use it as my main rig. It even works with my current amp allowing me to operate at anywhere from 60-300 watts depending on the band I am using.

The fact that it can slide off your desk, into a bag and travel out to the field so easily is highly appealing for those that like to operate outdoors. The BuddiPole systems pairs very nicely with it or even a simple piece of wire!

The fact is that the KX3 has been the reference radio in my lab in comparing many other radios and looks like it will continue to serve me in that capacity as well as others.

SDR purist may shy away from this radio, however, they really will be missing out on something unique in this hams opinion.

Additional Thoughts

I almost wasn't sure what I would say in additional thoughts given this has already been such a long review. Then it occurred to me that there was something to say. Having tested quite a few radios now from a basic ham operator's perspective, I have not been able to notice huge performance leaps of these radios verses the others I have used.

There is a clear difference between the IC7000 and 897D I used previously, that much is clear. Between the higher end rigs though, IE, Flex 5000, Anan 100D, KX3, QS1R, Excalibur, as an operator you don't see as much difference. In some cases you can hear some difference in the audio or off frequency.

It only makes it clearer to me to not get too hung up on performance rankings and to focus more on the features and benefits you expect from any given radio purchase. I say this with the thought in mind that at a certain point some DX's just get difficult to work to the point that claiming contact may lack quality. All of the higher end radios have certainly allowed better DXing, I am just not sure you would be better served by one more than another. Again, a better antenna may make a more significant difference than a few DB from one radio to another.

I am looking forward to purchasing the KXPA100 and then the 2M module when available. The KX3 reviewed here is fully loaded with all the other accessories minus the mobile mounts and the 2M module which is not available at this time.

KX3 Running off a BuddiPole Antenna at the park.

I am also strongly considering purchasing Elecrafts 500 watt amp (already purchased now) and ATU (aso purchased) to make the KX3 my main base station and use the Anan 100D as a band monitor.

About the Reviewer

You can learn more about Mark [NI0Z] on the site at the link below.

https://sdrzone.com/index.php?option=com_content&view=category&layout=blog&id=24&Itemid=506