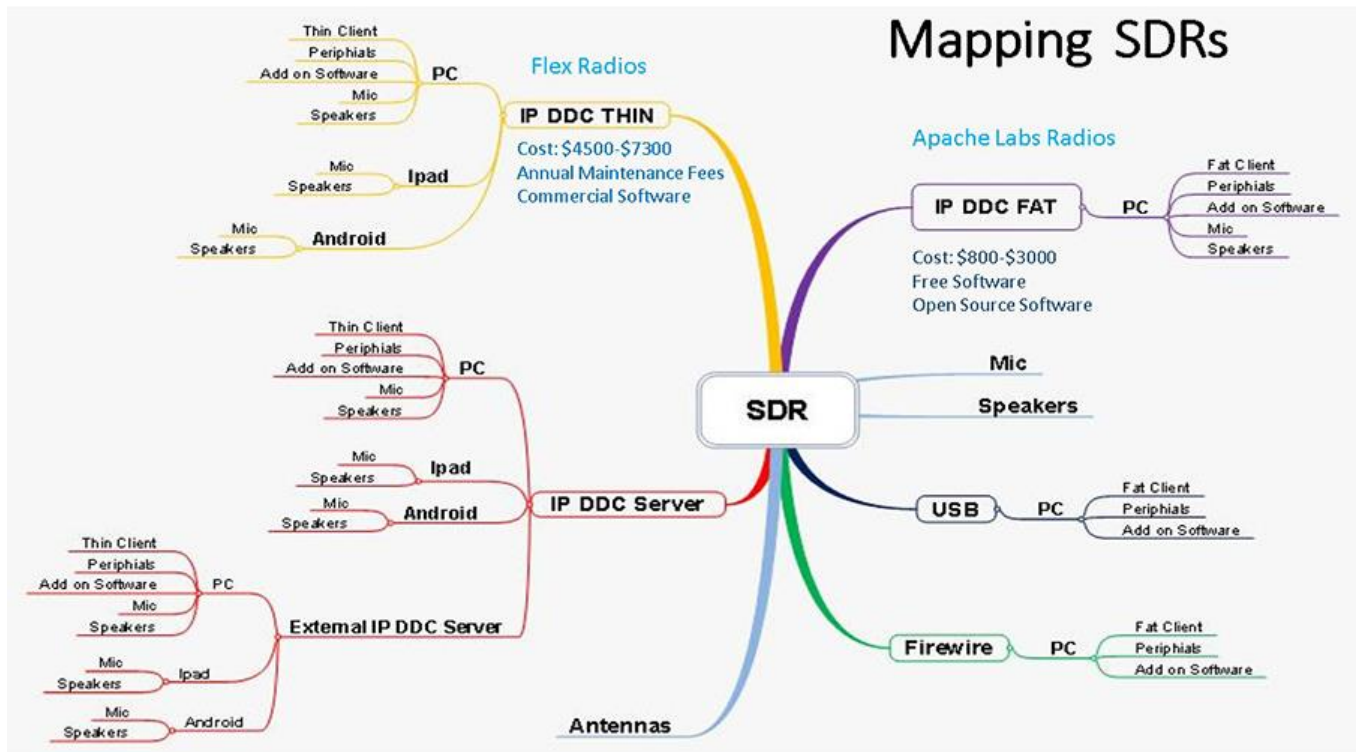


These New DDC SDRs



Z Featured Article

Updated 1/14/2013

This article was originally written last year and has been tweaked a little to reflect the current market.

There are several new DDC radios emerging on the market right now and many are very affordable such as the Afedri, The FunCube Dongles and the Winradio and QS1R SDRs!

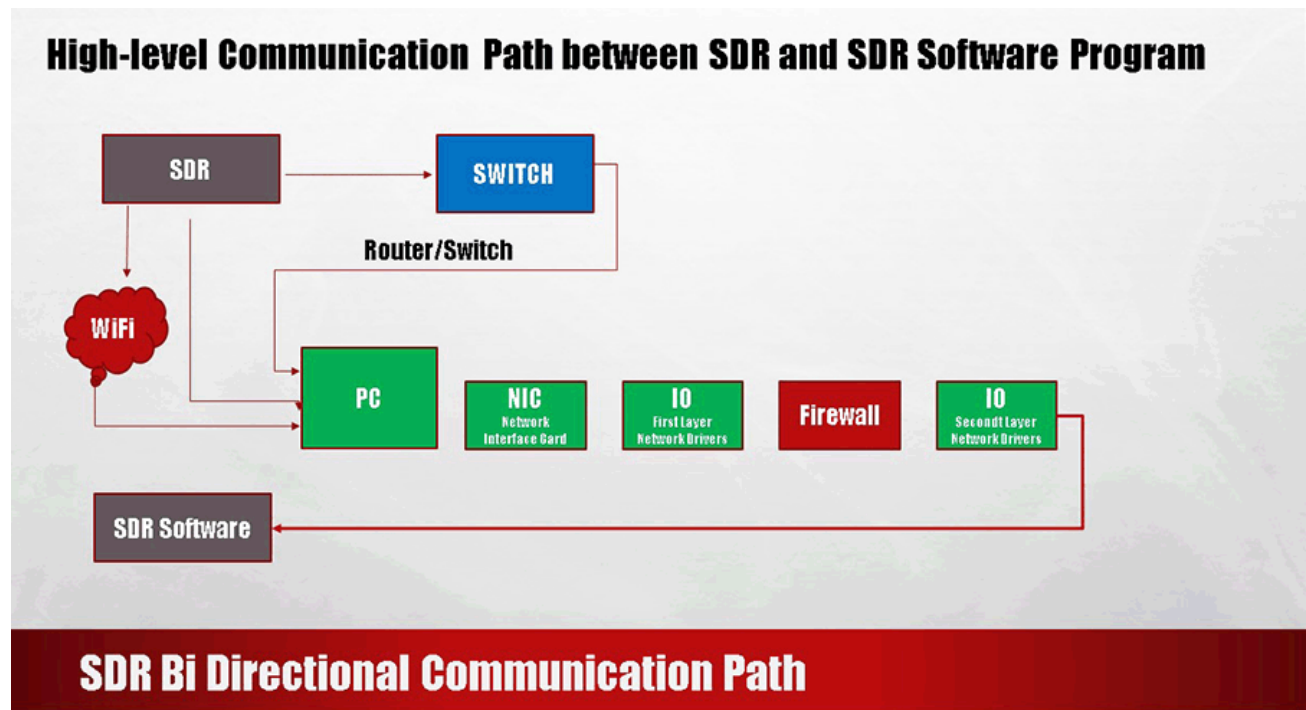
Other midrange models are available as well from Apache-Labs, Expert Electronics and SSB Electronics to name just a few. In some cases, you can't really distinguish just by Price. Examples are the QS1R which starts at just \$899. One could also contrast the Anan 100D at \$3500 against a

Flex 6700 weighing in at \$7000. This makes understanding all these options very important for the prospective buyer.

The chart above only covers a sample of the many possibilities. For example, the SunSDR2 is DDC and yet still requires a sound card. If all this seems somewhat confusing, your not alone. And, to top it off, we will see more and more SDRs coming out over these next few years like the Elad DUO and others.

Some of these new radios to work need very near real time connections to avoid latency and hiccups. There are different ways this could have been done, both good and bad.

The downside to the current way the Anan's manage as to their suitability for use over the internet is that they use legacy software and in a nutshell as it sits now you are passing full digitized RF across the network to the fat client. Any hiccup in your network manifests itself as a hiccup to a user. On a LAN with Gigabit switches there are no hiccups, it works way better than the firewire based devices ever did for my operations. Keep in mind as well that these radios unlike the Flex radios were never advertised to eventually work over the internet.



If you add WIFI into the equation, then we get limits. First off WIFI for the consumer is still not full Gigabit and second it's just not the same as a dedicated comparable CAT5/6. The protocol itself is not inherently suitable for use by an Anan for example.

Add any home network traffic from other devices (children with iPads, Laptops, ect) then it drops you another notch. I proclaimed this and internet security to be two issues early on with the 6Kseries announcements as issues needing to be resolved for internet radios. Add Internet remote operations into that mix and you're not likely going to have a good experience. Even if you wire directly to your router I question how viable the user experience will be for anything more than recreational use?

Maybe Google fiber will be a nice ticket. But say you are in a hotel traveling and want to use your radio, guess what, you're competing with any number of other guests for fast fluid bandwidth.

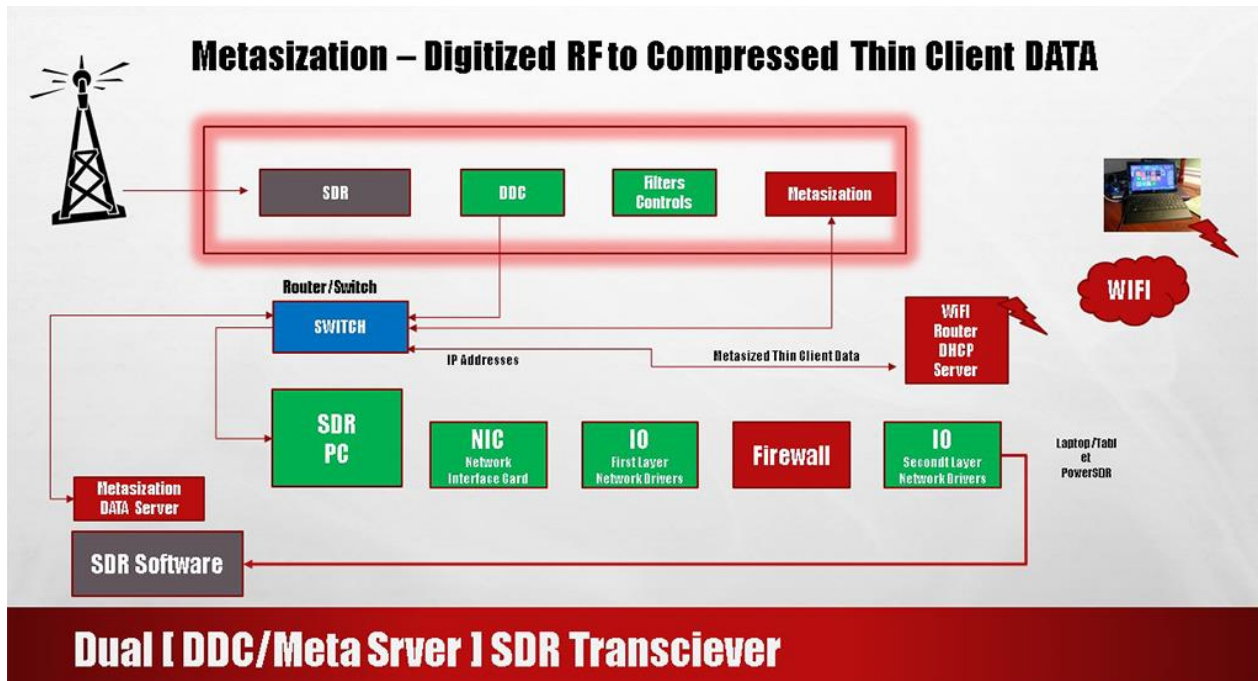
The new Flex radios take a much more viable approach by doing the RF Processing in the radio and passing display and audio information back to the thin client. This greatly reduces the data demands, sometimes to hundreds of times less bandwidth than radios passing the full RF.

One thing not really covered in all this is that your experience is also only going to be good as your device OS and possibly its ability to multitask. An E-mail coming into to your iPad while you are operating a radio might very well cause hiccups.

Other models are using USB. This seems to work just fine for some of these, however, one then has to determine how important multiple receivers are to them as wider and faster transfer rates are needed when we start going over 2 receivers. The New DUO claims as many as 4 receivers using an USB interface.

Older Text (Looks like they got it right1)

If Flex radio systems did things right they should be passing metadata and audio data to the thin client for presentation. Metadata would represent display data like the Panadaptor, waterfall and radio control information such as frequency, filters ect. This can be less real-time, be compressed and managed if there are hiccups. That leaves audio and or data to be streamed for the actual coms and time syncing of the display and coms. VOIP does a decent job on audio across the Internet these days so in less than ideal situations it could be useable, ie across the Internet.



If we want to do this on the Anan's currently the fastest bet would be to write metasization code into a SDR Server App that would perform the same functions for thin clients while still servicing fat clients for the ultimate dual SDR. Interestingly enough I learned on the forums that the FPGA in the Anan's is more than large enough and more than capable of running the full radio conversion and controls within the FPGA including all the filters, ect. Its just that few people have the knowledge, time and resources to actually write the FPGA code as Flex has done in there solution. The diagram represents both models where metasization is the conversion of RF, Audio and Control Data to thin meta data for processing by thin clients.

A recent survey on the Yahoogroup shows little interest in this approach for the OpenSDR platform. Little interest has been shown in the current vote as of this update.

My guess is even when we get there though that it just will still be like using a radio across the Internet, but better than the first fatter pipe method. If one goes and plays with WebSDR you can get a feel for how well the internet will work for SDR radios. I would venture to say though that WebSDR is probably a very lightweight version of Internet radio control. IE, the problem in all this isn't really the radios, its the network and the nature of our beast!

Its also important to understand that with DDC receivers there is no mysterious magic in the performance limits as performance is directly related by the quality and specs of the ADC that's used. The more bits the better it should perform.

Folks may be surprised when these radios got rated by Rob Sherwood that mathematically speaking, none should top the traditional receiver charts. You should not let that deter you either as there are areas where these radios shine and then there are areas they will pale in comparison to the large fleet of knobbed radios available today.

If we look at the KX3 it is through a hybrid approach that it has been able to reach the top of the charts. Still though, there is room in how radio manufacturers implement the technology for them to not see the maximum levels the ADC's can theoretically perform.

There is a group of performance testing hams that are working on better ways to compare analog receivers to DDC receivers. I have had some conversations offline over the past few months that may come as a surprise to SDR enthusiasts when it's all figured out.

I believe that we will need the next level of ADC's, perhaps 18-24bit to have SDR's that break new ground in receiver performance. If you think about that, we are only a few years away from seeing this become a reality as the next generation should see better and more capable ADC's.

All this brings us to a couple of key thoughts I think Hams need to seriously consider Asking themselves.

Do I as a ham have a shack and antenna worthy of a \$3000 or \$7000 radio that buying one will yield me true performance gains?

I think that this question really became relevant years ago but hams wanting gorgeous top ranked radios don't like to seriously think about too long! In my case my shack is good enough for a \$3000 radio (easier to justify because lots of decent radios cost that or more).

As I said, I doubt I need a \$7000 radio. If I had a Yagi on a tower and primo coax run to the shack, then it might be worthy. My Hex on a roof tower is a class B type setup and a super expensive rig isn't likely going to change my actual operating performance. The exception here though is also operating controls where some radios are far better for contesting than others.

Do I as a ham really need to operate my radio over Internet? If so I honestly believe there are better options than these radios that are already available today.

Do I as a ham expect these radios to deliver miracles?

Do the other features and characteristics of the radio warrant a larger expenditure. For example, the new flex radios offer many other features that other radios simply don't that makes the higher price tag worthwhile.

The truth is that to date, my best ham investment was the hex beam and its proper installation. I have gotten far more performance out of that than three excellent radios I own now.

Here are a few final thoughts:

While the new radios offer lots of new cool tech and features, their real promise is still waiting to be developed.

Hardware on this new generation of radios is somewhat ahead of Software! I believe it will be the same for the 6K series where both camps have waits ahead.

The Flex users will have to wait over the next year to get full regular features that 5K owners currently enjoy and the Anan users while they have the 5K features now will wait a year or more likely for more modern software like cuSDR to be fully developed.

I have had 5 receivers running on 5 bands running 192K wide and the Anan 100D a suspect that number will go up in the next few weeks. The notion and utility of this is cooler than I thought it would be and I can't wait to have all of them that I want working the way I want.

Neither of these company's new radios are currently going to revolutionize ham radio yet, but they can if we the user community push the developers to do more with them. As users the focus of our push has to be for better software now or we won't see the next great things that could be! We will merely get greater hardware with more untapped potential.

We really need a new framework for Open Source SDR radio in my limited opinion. We need a server type application with a plugin framework/architecture so people can add in new functions as they please that can be activated or deactivated in the engine as need and when desired By the ham.

These could be anything from combining all the slices is into a massive receiver with the users chosen frequency range , to beacon functions,

diversity functions, multiple radio functions, thin client functions to even being able to even support bridging servers for comparative functions like propagation analysis across beacons. Think of a super-server function where we parallel process RF! That means I don't have to have a second antenna even to do diversity, we can receive someone else's meta data operating nearby to adjust our reception. I could test my station efficiency by linking to other servers. The possibilities are seemingly limitless.

Have fun above all, don't get distressed, you're going to like these radios, especially if you avoid the hype cycle! They as well as all the other new DDC SDRs are going to be very cool!

73!

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