

# Demo Proposal: Sora – High Performance Software Radio Using General Purpose Multi-core Processors

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This demo shows Sora, a fully programmable software radio platform based on general-purpose processors. With Sora, developers can implement and experiment with high-speed wireless protocol stacks, e.g., IEEE 802.11a/b/g, on commodity PCs, using familiar programming environments with powerful tools on standard operating systems.

In this demo, we will show a Sora-based demonstration radio system, SoftWiFi, which supports the full suite of 802.11a/b/g modulation rates, seamlessly inter-operates with commercial 802.11 NICs, and achieves equivalent performance as commercial NICs at each modulation.

The demo setup is shown in Figure 1. A Dell XPS 730 machine is equipped with a Sora Radio Control Board (RCB) (as shown in Figure 2) and a 2.4/5GHz Radio Front-end and running SoftWiFi implementation. It can communicate seamlessly to a laptop equipped a standard commercial IEEE 802.11a/b/g NIC. We show various network applications, including simple “ping”, web browsing, high-definition video streaming, and two-way video chatting, can operate on SoftWiFi and achieve good performance.



Figure 1: Demo setup.

We will also show other applications based on Sora. For example, one interesting application is to implement a software spectrum analyzer in WiFi band. Figure 3

This work was performed when Ji Fang, He Liu, Yusheng Ye, and Shen Wang were visiting students and Geoffrey M. Voelker was a visiting researcher at Microsoft Research Asia.

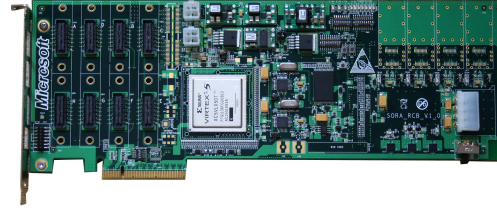


Figure 2: Sora radio control board.

shows the interface of such a simple spectrum analyzer that can graphically display the waveform and modulation points in a constellation graph, as well as the demodulated results. Note that a commercial spectrum analyzer may have the similar functionalities and wider sensing band, but they are much more expensive.

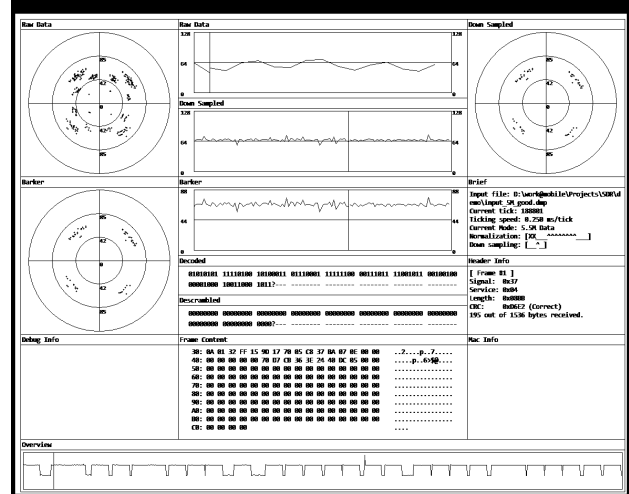


Figure 3: Sora-based Spectrum Analyzer.

In summary, in the demo, we show the flexibility and capability of Sora as a high-speed software radio research platform. We are planning moderate production of the Sora RCB and RF modules for use by other researchers and we also plan to release the Sora software to the wireless network research community. Our final goal is to make Sora available to the research community to facilitate the experimental research in high-speed wide-band wireless communication and networking.