UxS CHALLENGES, EPIQ SOLUTIONS

Expectations on UxS suppliers to innovate and evolve their platforms quickly, and to ramp to volume faster are getting higher and higher. The addition of spectral monitoring to even small platforms dramatically increases situational awareness, enabled by small and flexible Software Defined Radios (SDRs). For design teams, a frequent issue is the 'make vs. buy' decision for the SDR, and whether the project can afford the time or engineering bandwidth to make every piece in-house. As a leading supplier of Small Form Factor (SFF) and open architecture SDRs, Epiq obviously has strong opinions on this topic. ***Figure 1*** lists some of the challenges of UxS development, some of the helpful technologies being brought to bear, and where Epiq contributes. The list is not exhaustive, but intended as the start of a conversation. We have a broad product range, and a small sample is shown in overview form in ***Figure 2***.

The diagrams above show some of the key SDR functional blocks and performance attributes that support the benefits shown in ***Figure 1***. They range from the **M.2** which has the least functionality but is tiny, draws only around 2W and weighs 6g, all the way through to models like the powerhouse **X40** with extremely wide frequency coverage, instantaneous bandwidth (IBW) and includes an integrated Nvidia CPU/GPU for AI/ML on-board

Challenge		Technology Enablers	Epiq Contributions
Project	Pressure to reduce time to deployment	COTS Open systems	Ultra-small SFF, 3U VPX development platforms; standard software abstraction across all platforms
	Downward pressure on cost targets; increased desire for attritable platforms	Increased integration Evolving COTS chips for RFSoC, RFIC lower costs	Highly integrated solutions that maximize that maximize RF performance with SWaP
	Fast ramp to volume	Less reliance on bespoke designs, more standard components & subsystems	Complete range of ultra-small platforms to choose from; commercial manufacturing model, can often ship in 4-6 weeks
	Fewer RF & Microwave engineers available	Outsourcing Off the shelf subsystems	Precisely engineered microwave front-ends, software abstraction simplifies control
	Increased supplier competition	Rapid development, adaptation of off-the-shelf sub-components reduces cost	Pre-designed, low cost & flexible platforms increase competitiveness
Mission	Rapidly changing mission requirements	Modular payloads CPU/GPU enable flexible firmware changes	Range of RF front-ends and processing options sized to suit mission. CPU/GPU in SFF allow AI/ML hosting
	Crowded spectrum; threats beyond 6 GHz	Move beyond standard Wi-Fi chips	RF pre-selection, options to 18 GHz Increasing IBW aids coverage
	Increased capability required in smaller payload sizes	More channels Evolving SWaP capabilities	Configurable Rx, Tx combinations, options up to 8 channels Rx
	Need for greater range in small platforms	Advancement of SWaP capabilities in integrated technologies aids range and cost	Ultra-small SDRs allow more capabilities in smaller platforms while minimizing SWaP

Figure 1: Comparison of UxS project and mission challenges

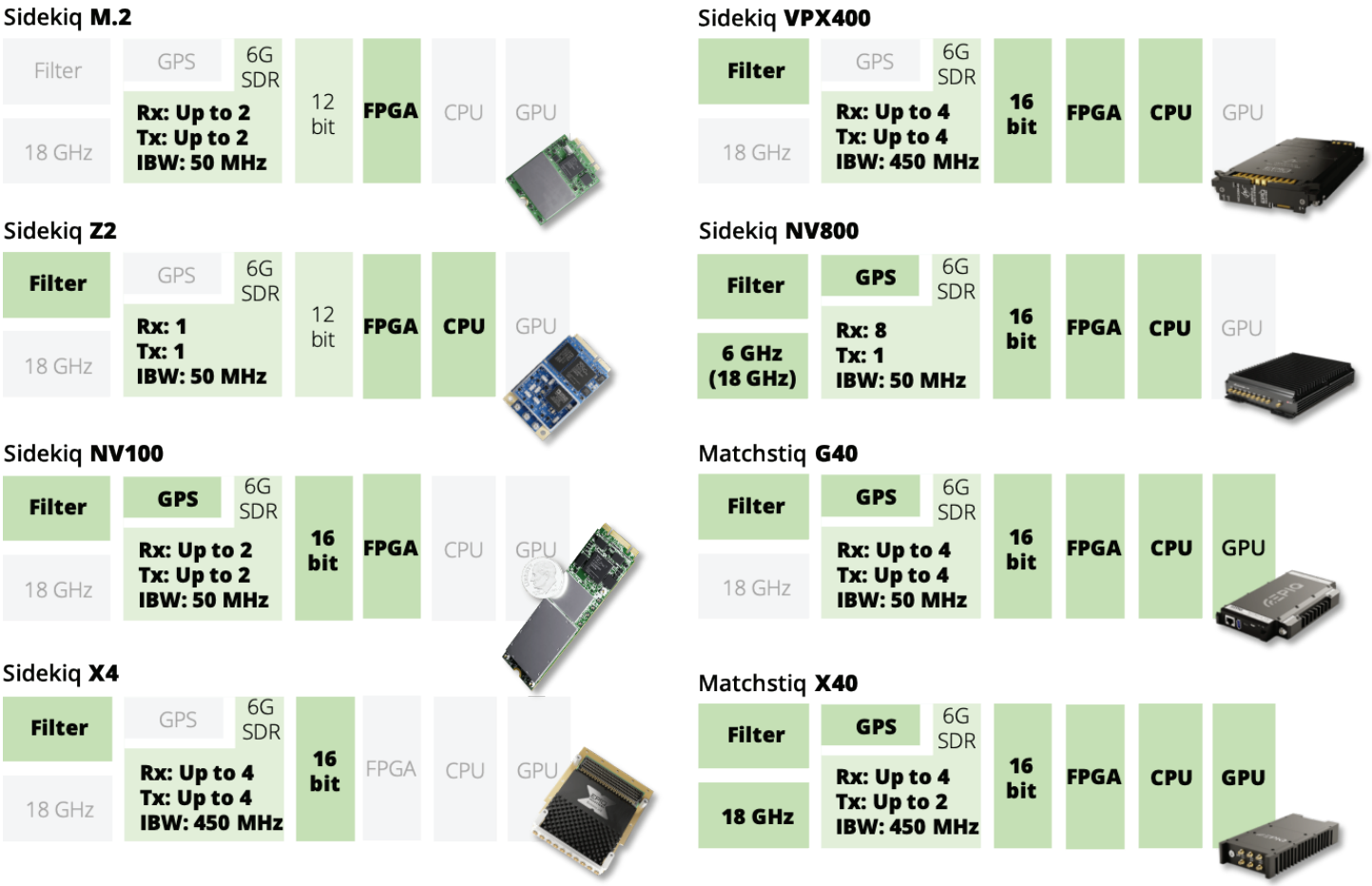

Figure 2: Example Epiq SDRs showing high level functional blocks available by model.

processing. All of our SDR models are controlled using our unique and efficient **Libsidekiq** software library which abstracts users from worrying about the thousands of hardware registers needed to control sophisticated radios like these. This uniform control layer means that code written for one model directly and easily leverages to other models.

We're passionate about our radios and continue to innovate so that you don't have to. Let us take some pressure off your next UxS project. **Contact us** for more details or **visit our website**.

ABOUT EPIQ

Epiq Solutions develops cutting edge tools for engineering teams and government-focused organizations requiring situational awareness and detailed insight into their RF environments in order to identify and act against wireless threats.

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