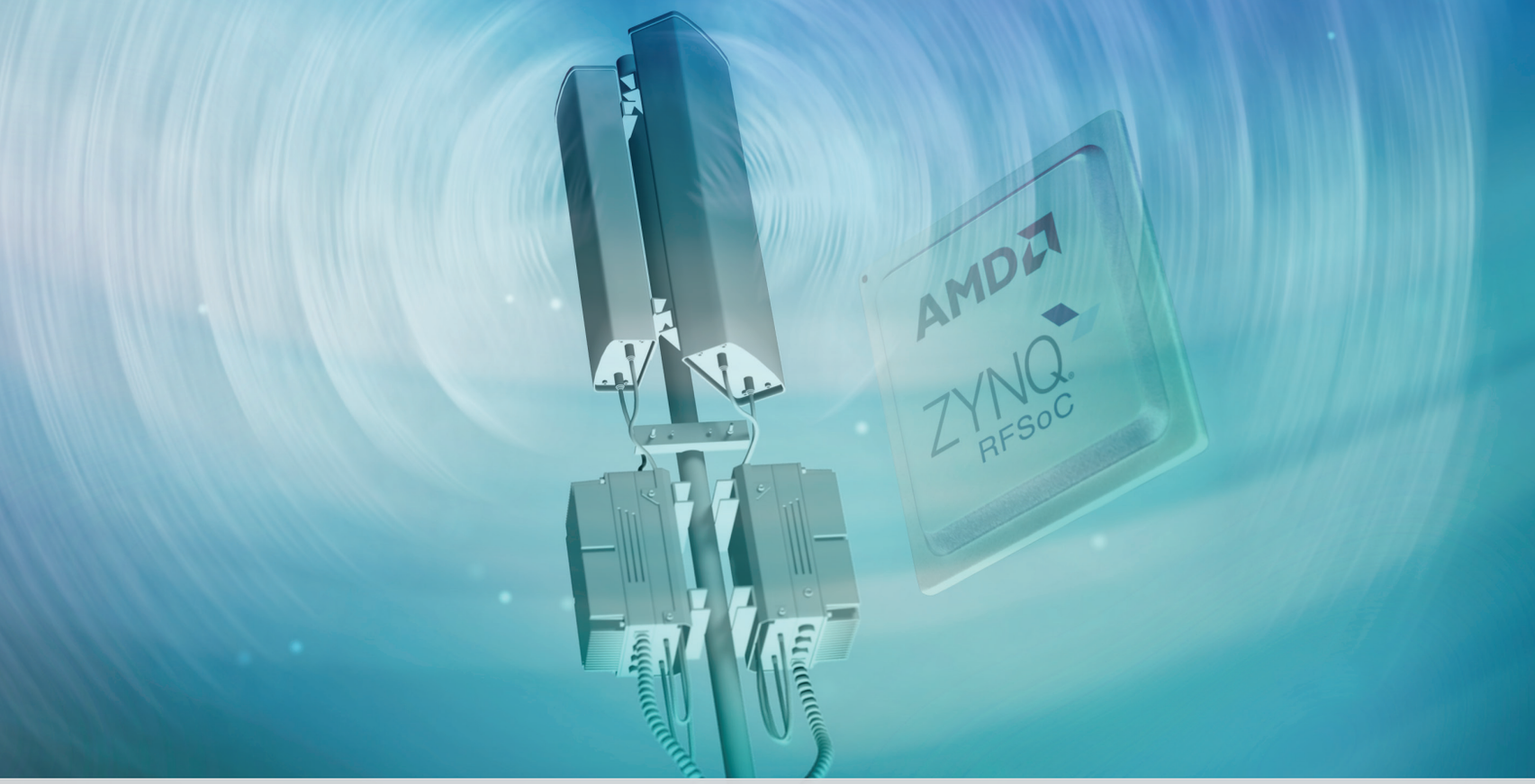
Edited by: Louise Crockett David Northcote Robert W. Stewart

Software Defined Radio with Zynq® UltraScale+ RFSoC



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Acknowledgements

We are delighted to publish this book on Software Defined Radio Systems (SDR) with the AMD Zynq UltraScale+ RFSoC. The book represents the culmination of a few years of research, development and design activities with the latest RFSoC platforms alongside our writing efforts to integrate the theory and principles of SDR and DSP (digital signal processing) in a publication that is accessible to engineering students, as well as practising engineers and technical managers in industry. The publication of this book represents a great team effort by our StrathSDR team at the University of Strathclyde, and is built on a superb collaboration relationship with our colleagues at AMD (and as Xilinx prior to 2021), with whom we are proud to have had a fruitful relationship with since 2006.

To the researchers in our StrathSDR group who contributed as chapter authors, co-authors, reviewers, designers, even graphic artists, many thanks indeed! These individuals are (in order of 'appearance' in the book): Lewis Brown, Kenny Barlee, Josh Goldsmith, Marius Šiaučiulis, Graeme Fitzpatrick, Douglas Allan, Lewis McLaughlin, James Craig, Blair McTaggart, Tawachi Nyasulu, Andrew Maclellan, Ehinomen Atimati, and David Crawford. We greatly appreciate your enthusiasm, professionalism, and all of the knowledge and ideas that you brought to the whole process. To those who contributed in various ways to the practical materials that we have released alongside this book, please accept our thanks too — most are also chapter authors and already mentioned above, but also including Craig Ramsay and Sarunas (Shawn) Kalade. Thanks to Damien Muir for editing support and website development and to Kenny Barlee for special photography skills and setting up the book cloud and web services, and also to Jackie Malloy for highly-valued administrative support.

A huge thanks to our friends and colleagues at AMD for enabling the environment that allowed the creation of this book. To Patrick Lysaght — thanks (again) for your continuing support, hands-on engagement and guidance, and all of the opportunities we have been able to explore together, not just in this project but over many years. We are grateful to Brendan Farley and Ivo Bolsens — thanks for supporting our work, and putting your faith in us to make this book happen. To long-term colleagues Cathal McCabe, Graham Schelle, and more recently Shane Flemming, Nathan Jachimiec, and Shawn Kalade; as well as your practical help, we have also

greatly valued all of the technical discussions, and the benefit of your wisdom and gentle encouragement over the course of this book project — many thanks.

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It goes without saying that the practical elements of this book project were facilitated by having easy access to software tools and development boards; therefore thanks to AMD University Program for providing us with all the resources we needed, and a special shout out to Naveen Purushotham for taking care of all the logistics. We also must acknowledge the RFSoC pioneers and engineering design teams in Ireland and in the USA (at both AMD and formerly Xilinx) for their prowess in designing the RFSoC over the last few years. On this note, a special thank you to Liam Madden for his support in the genesis and early ideas for this book project. Again, this is incredible technology and really is the ultimate SoC — system-on-chip. We are still in awe of just how flexible and powerful the computation is on the RFSoC is, and we marvel at the sheer number of RF ADC inputs and DAC output channels available, sampling at rates of several GHz — all on a single device.

Thanks also to University of Strathclyde for supporting our StrathSDR research team and providing a fantastic environment to work in. Alongside the book writing tools of PCs, desktop publishing, and graphics packages, the University provides us with a very functional lab with the latest state of the art SDR boards, instrumentation, RF facilities, test-beds as well as the academic freedom to design end to end real radio systems for standards such 5G and other applications. Our team here has more than 25 years experience in DSP, FPGAs, SDR and radio standards, so additionally thanks to the wider team at StrathSDR and our colleagues at our University SDR spin-out company, including: Malcolm Brew, Cameron Speirs, Damien Muir, Dani Anderson, Anthony Ighagbon, Samuel Yoffe, Ryan Provan, Shruthi Kumar and Marcin Mrozowski. Our wider team is not just researching and simulating, we really are building RFSoC SDR solutions with a number of industry, government and academic partners to make real SDR transceivers for 5G radios and other standards.

Therefore we hope our engineering team's design and implementation experience shines through in the book and you find it a useful. Please do get in touch if you we can support you in your RFSoC and SDR journey.

Last but certainly not least, thanks to our families and friends for their understanding while we completed this project!

Louise Crockett, David Northcote, Bob Stewart. *January 2023.*

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University of Strathclyde Glasgow
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