# sureCore now licensing its *CryoMem* range of IP for Quantum Computing

**Sheffield, UK - 26 November, 2024.** sureCore, the memory specialist, has announced that it is now licensing its *CryoMem*™ suite of Memory IP that is designed for use at the extremely low temperatures required for Quantum Computing (QC) applications. This is as a result of an Innovate UK-funded consortium to develop cryo-tolerant semiconductor IP. The aim of the project was to develop and prove a range of foundation IP that can be licenced to designers allowing them to create their own custom Cryo-CMOS SoC solutions. This will help accelerate QC scaling by enabling the migration of the control electronics into the cryostat to be close to the qubits.

Paul Wells, sureCore's CEO, said, "We have successfully tested 180nm sample chips at 77K so we can now start licencing this IP and excitingly, we are also in the middle of evaluating 22FDX demonstrator IP and the plan is to make these available for licencing shortly. Every potential customer who is interested in licensing IP always wants to know if it is silicon proven and can they have an evaluation report. It's great to be able to say yes, and, not only that, but we can also provide you with a full evaluation board.

"We have just closed a funding round, part of which will enable us to develop this rapidly growing sector of our business. Our success with proven Cryo-CMOS is really going to help accelerate the growth of the QC community by unleashing the power of the fabless business model. The availability of this key enabling Cryo IP which, to date, has been the preserve of the Tier-1 players, will help level the playing field for start-ups struggling to commercialise their novel qubit technologies."

**Project Background**

sureCore has exploited its state-of-the-art, ultra-low power memory design skills to create embedded Static Random Access Memory (SRAM), Register Files & Contact Programmable ROM, all key building blocks for any digital sub-system, that is capable of operating from 77K (-196°C) down to the near absolute zero temperatures needed by Quantum Computers (QCs). In addition, both standard cell and IO cell libraries have been re-characterised for operation at cryogenic temperatures thereby enabling an industry standard RTL to GDSII physical design flow to be readily adopted.

A key barrier to QC scaling is being able to collocate ever increasingly complex control electronics close to the qubits that must be housed at cryogenic temperatures in the cryostat. In doing so, it is essential that the control chip power consumption is kept as low as possible to

ensure that excess heat is kept to a minimum so it does not cause additional thermal load on the cryostat. Here, sureCore's low power design expertise proved pivotal.

Current QC designs have the control electronics located outside the cryostat as modern semiconductor technology is only qualified to work down to -40°C. As the temperature is reduced close to absolute zero the operating characteristics of the transistors change markedly. Measuring, understanding and modelling this behavioural change over the past months showcases the potential to build interface chips that can control and monitor qubits at cryogenic temperatures.

At the moment, expensive bulky cabling connects room temperature control electronics to the qubits housed in the cryostat. Enabling QC developers to be able to exploit the fabless design paradigm and create their own custom cryogenic control SoCs, which can be housed with the qubits inside the cryostat, is a game-changer that will rapidly enable QC scaling. Immediate benefits include cost, size and, most importantly, latency reduction. The next step will be characterising the demonstrator chip at cryo temperatures to further refine and validate the models to help improve the performance.

The IUK-funded consortium is a complete ecosystem including academic and industrial partners with the expertise and core competencies required to develop cryo-tolerant semiconductor IP. The aim of the project was to develop and prove a suite of foundation IP that can be licenced to designers allowing them to create their own Cryo-CMOS SoC solutions. By doing so their competitive edge in the Quantum Computing space will be dramatically accelerated.

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