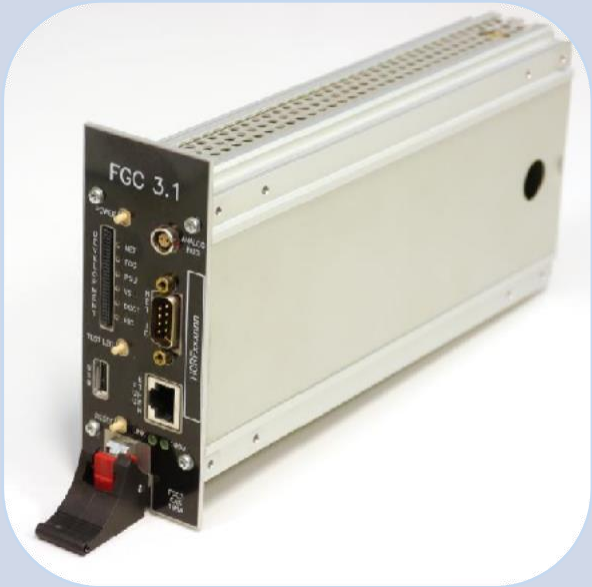
Powerful Digital Controls for high stability power supplies

Digital controls for high stability and reliability power supplies used to power superconducting as well as conventional magnets

- A family of 4-Quadrant Magnet Power Supplies and a family of Short Pulse Magnet Power Supplies with very stringent specifications to power magnets for particle accelerators such as linacs, synchrotrons, cyclotrons, particle sources and injection systems.
- A powerful, high performance and flexible digital control system, the Function Generator Controller (FGC) that can control a wide range of power converters. FGCs can be deployed with any power supply design, not only CERN designs and provide high precision, improved power supply performance and stability.
- FGC controlled power supplies can be integrated in EPICS or TANGO control infrastructures, the most commonly used frameworks.
- FGC technology comes with a software stack of tools to facilitate power supply management and diagnostics, especially in large scale projects where many power supplies are deployed.



Technology Transfer proposal BSBF 2022

Original/Potential Field of Application

- The power supplies were developed in order to power CERN accelerator magnets. This includes superconducting magnets and conventional magnets. Power supplies covering a wide spectrum of current, voltage and power were developed for the different magnet circuits.
- The FGC system was developed in order to provide a unified, flexible, high performance, multi-function controls environment across a wide range of power converters.

- Any application that requires low, medium or high-power power supplies.
- Any project aiming to rationalize their PSUs controls strategy away from 'black box' proprietary solutions.
- Any project which includes large scale power supply deployment requiring powerful management tools.
- Any project seeking to retrofit a powerful digital control system to existing commercial power supplies.
- Power supplies applications: linacs, synchrotrons, cyclotrons, particle sources conventional magnets, heating systems of particle sources

Proposal SWOT Analysis

Strengths

- High performance, high accuracy, high stability and reliability.
- Very powerful and flexible controls.
- Supports the most widely used controls frameworks (TANGO & EPICS).
- Long support cycle.

Weaknesses

- Cost.
- Preparatory study necessary in order to incorporate CERN designs in a commercial offer.

Opportunities

- Unified controls environment across a wide range of power converters for existing infrastructures.
- Integration of power supplies designs in a manufacturer's catalogue.
- Use of the FGC system with any commercial power supply design.

Threats

- Bespoke power supplies developments proposed by engineering companies.
- Cheap less performant but adequate controls solutions especially on the low power range.

IPR Status & Contact Information

- The IPR status of the technology is CERN proprietary. However the firmware and power supply designs are available for inspection.

- For further information, contact Nick Ziogas https://kt.cern/team/nick-ziogas

- CERN, the European Organization for Nuclear Research, is one of the world's largest and most respected centres for scientific research.

  The transfer of CERN technologies and expertise to society is an integral part of CERN's activities, providing novel solutions in many fields.