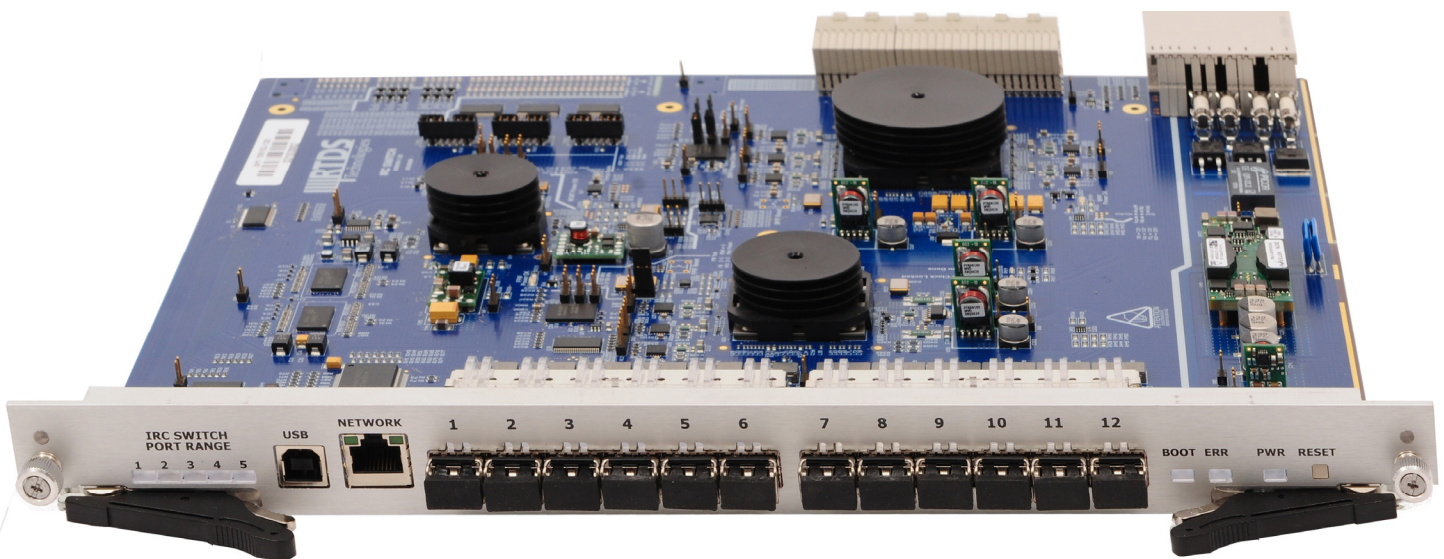# IRC SWITCH

Large scale real time power system simulation is becoming more and more common. Utilities, manufacturers and research groups are looking to large scale simulators to develop, investigate and demonstrate new technologies as well as network behaviour. Wide area protection and control, integration of renewables, Smart Grid initiatives and many other factors are pushing the use of large scale real time simulation.

RTDS Technologies is committed to providing the best possible technology for real time power system simulation and has invested significant effort directed to large scale simulators. Part of that effort included the development of the IRC Switch to provide direct Inter-Rack Communication (IRC) between as many as 60 racks. The primary function of the IRC Switch is to act as a high speed switch used to augment IRC connections for inter-rack communication. The IRC Switch is used in systems with many racks. For large Simulators (over 7 racks) the IRC Switch becomes advantageous. Direct interconnection between up to 60 racks in a system is possible. In fact, the more racks the simulator has, the more benefit the IRC Switch will bring.
The IRC Switch is for use with GTWIF based simulators which are otherwise limited to six IRC connections per rack. If the IRC Switch is not used for a simulator with more than seven racks, not all racks will have direct communication with one another.

Very large scale networks have been successfully built and operated on simulators with more than twenty racks, but the restriction on the IRC connections had to be taken into consideration. With simplified connections and full communication between all racks, the IRC Switch allows the implementation of large scale simulations without restrictions.

The IRC Switch provides several benefits over GTWIF and previous generation IRC connected systems

- Greater connectivity: Without the IRC Switch, each rack can directly communicate with up to 6 other racks. The IRC Switch provides full interconnection between all racks on systems up to 60 racks.

- Greater flexibility: Without the IRC Switch, on systems greater than 7 racks care must be taken to ensure proper rack connections. The user has to know which racks are connected together while building their case. With the IRC Switch, each rack can communicate directly with all the other racks in the system, simplifying case building.

- Simplified wiring: Instead of up to 6 connections per rack to other racks, the IRC Switch requires only one fiber connection per rack to it, allowing for easy setup of larger systems. For example, in a 30 rack system, 30x6 = 180 connections were required to 30 different locations. With the IRC Switch, only 30 coNnections are required and they are all routed to one location.

IRC Switch Specifications

- 12 to 60 communication ports (1 to 5 cards)

- Each port communicates at 2GBd using 62.5/125 μm multi-mode fiber

- Fully bi-directional interconnect between all racks in a simulation

- Broadcast capability allows a rack to transmit a packet to all potential receiving racks

- Housed in a mid-size cubicle together with the Global Bus Hub