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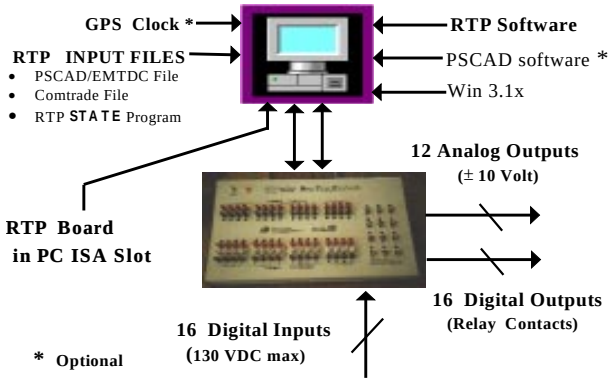
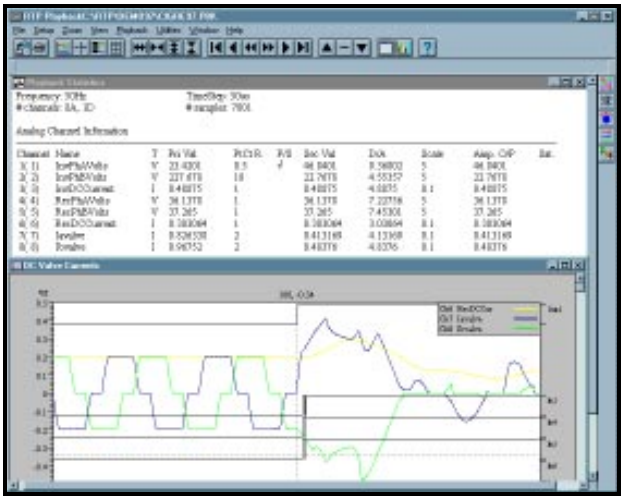
Real Time Playback RTP

Environmental concerns and deregulation strategies are forcing power systems to operate closer to their stability limits. Therefore greater demands are being placed on the protection and control apparatus leading to the introduction of new and innovative protection and control systems. These systems are often digitally based and now contain many functions. Design, testing, calibration and maintenance of these new protection and control systems are becoming increasingly demanding.

Real Time Playback, RTP, is a Pentium based computer testing instrument operating on Windows 3.1. The RTP can be best described as a 12 channel arbitrary waveform generator with a powerful and user friendly graphic interface. All simulation waveforms generated in PSCAD/EMTDC can be utilized for testing protection or control equipment. The RTP system provides a natural bridge connecting simulation results and the voltage signals required by real world devices. The RTP features have been developed with utility requirements in mind.



RTP System Configuration



Sample RTP PlayBack Screen

The RTP system consists of a custom interface board which plugs into a ISA slot on the computer motherboard. This interface board supports 12 analog outputs, 16 digital inputs, 16 digital outputs, and a global positioning satellite (GPS) 1 pulse per second timing input. The computer level signals are cabled to an external connection panel which provides the user with a BNC interface connection for each analog output, and 4 mm connectors for digital inputs and outputs. Each output signal has an associated LED to indicate status. This connection panel provides a flexible real world interface to either the control system under test or to amplifiers, which in turn are connected to the equipment to be tested.

The strengths of the RTP system are found in the powerful graphical user interface, the ease in which PSCAD/EMTDC signals can be

RTP Relay Testing

transferred and played back for real time testing, and the flexibility to allow the utility to utilize existing amplifier equipment. RTP is suitable for testing complex relay protection, HVDC control and protection and Custom Power controllers in an open loop mode.

If you would like more information on RTP, please contact the Centre at RTP@hvdc.ca or visit our web site www.hvdc.ca

You are invited to visit our hospitality suite in the Hyatt Regency Hotel during the Winter IEEE PES meeting Feb. 2 to 4 for a RTP demonstration.

Winter 1998 IEEE PES Meeting
Centre Hospitality Suite

You Are Cordially Invited To Visit Us At Our Hospitality Suite During The PES IEEE Winter Meeting In Tampa Bay
February 2 to 4, 1998

Tampa Bay Hyatt Regency Westshore Hotel

Monday to Wednesday Evenings February 2 - 4 5:00 pm to 8:00 pm

Come and Discuss PSCAD/EMTDC Questions and Applications With Us !!!

- PSCAD / EMTDC Demonstration
- RTP Demonstration

Synchronous Dc Links

Dc transmission systems usually operate asynchronously. By adding a straightforward enhancement to controls, dc link power can be made to respond to ac system voltage phase angle to emulate an ac transmission line. If the ac systems on each side of the synchronous dc link lose synchronism, no out of step tripping will occur. Instead, the dc link throughput power remains at its limit and when the frequency difference between the two systems diminishes, the dc link automatically and naturally locks the two systems back into synchronism.

The back-to-back dc links which interconnect the four main asynchronous power systems in North America are the prime candidates for upgrading to synchronous operation. Once the back-to-back dc links are functional as synchronizers, lower cost ac interconnections may now be added to enhance overall synchronism and to increase capacity for electricity transactions.

This concept is being explored by the Project 2000 group sponsored by EPRI and supported by EPRI, the Centre and other interested utilities and parties. Even if synchronism is not required, but a power uprating is, a technically attractive alternative is the use of a back-to-back voltage source converter as shown in Figure 1.

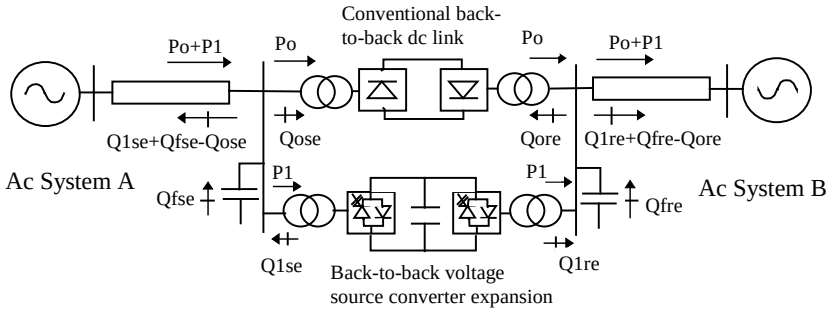


Figure 1
Increasing the capacity of a back-to-back dc link with a back-to-back voltage source converter

Other interesting applications for upgrading and synchronizing an existing back-to-back link are being investigated. A parallel series capacitor is one possibility as shown in Figure 2. Studies with the PSCAD/EMTDC simulation program have shown that these configurations are indeed technically feasible.

Is there any incentive for converting back-to-back dc links to synchronous operation? In the long term, the evolving market place for electricity will determine the need and whether adequate return on the investment is possible. If markets for electricity can be expanded by widening the obvious bottlenecks which the existing back-to-back dc links and their immediate ac transmission systems impose, then this in itself provides excellent reason to pursue the question further. The Centre can assist you in exploring these and any other interesting applications you may be considering.

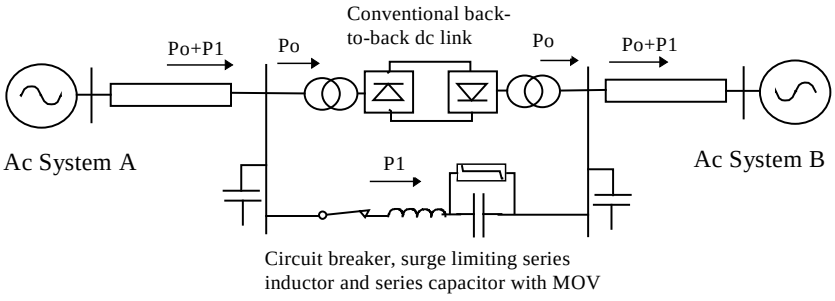


Figure 2
Increasing the capacity of a synchronous dc link with a parallel series capacitor

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SOLID STATE SWITCH : COLLABORATIVE RESEARCH PROJECT WITH MANITOBA HYDRO

Manitoba Hydro would like to hear from utilities interested in participating in a R&D project involving the application of a solid state switch to a distribution substation. The project would involve the development, design, manufacture, testing, installation and monitoring of a solid-state switch in the bus-tie position, aimed at limiting fault current contribution between bus sections.

The switch is proposed to be in the range of 15-25 kV, 600-1200 A continuous rating, depending on the interest and cost. The potential benefits to the industry are improved power quality in existing installations and reduced capital costs of new substations and feeders.

It is envisioned that a supplier for the switch would be selected through an invitation-to-tender process, with specification, tender analysis and switch performance evaluation done jointly by the utilities. Manitoba Hydro proposes to install and monitor the switch on its system.

Interested parties may call either:
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