

# Injection Efficiency Monitor for the Australian Synchrotron

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The Australian Synchrotron is moving towards a continuous injection mode called *top-up*. During top-up the linac and booster synchrotron injection system will be in continuous operation rather than used every eight hours the way they are used at present. In order to monitor the performance of the injection system a real-time injection efficiency monitoring system has been developed. The system consists of several Fast Current Transformers [1] (FCT) and matching digitisers [2] and is designed to count every beam pulse and measure the transmission efficiency through the whole accelerator complex. After calibrating the system using a properly matched Faraday cup at the electron gun, a transmission efficiency is then calculated as each stage of transferring the beam from 90 keV out of the gun to 3 GeV in the storage ring. The system is used to optimise the injection process in order to maximise the injection efficiency and as an early warning system when equipment starts to fail and the injection efficiency decreases.

[1] Bergoz Fast Current Transformer, Bergoz Instrumentation, <http://www.bergoz.com>.

[2] Agilent U1082A Acqiris 8-bit High-Speed PCI, <http://www.agilent.com>.