

#### Ramp controller board: Salient features

- A24, D16 VME Slave
- Generates optically isolated memory scanning clock and timing pulses
- Also generates ramp start sequence,
- ON/OFF, reset and DC/RAMP mode control signals
- On board DC-DC conv. for isolated power

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#### A.12 VME based fast ADC

A VME based fast ADC card has been designed and developed. This card is a part of the digital signal processing based tune measurement system being developed for Indus-2 synchrotron radiation source. The beam response to a stimulus will be monitored by the strip line beam position monitor and digitized by the fast ADC card. The tune value will be obtained by computing FFT of the acquired data. The card employs a 10bit, 20MS/sec sampling ADC. The digitized data is stored in a 64K word fast static RAM. The number of samples to be taken and the trigger mode (external/internal) is programmable. The sampling rate is decided by an externally applied sampling clock. After receiving the trigger, required number of samples are digitized by the ADC and stored in the memory. The data is then read by the controller and transferred to a PC on serial bus. The GUI software has been written in visual basic language, which displays the acquired signal. It also has provision to evaluate FFT of the acquired signal and display frequency spectrum of the waveform. The number of points of FFT and window functions is selectable by the user. This card has been successfully tested up to a sampling clock frequency of 10MHz. Further improvements in the circuit design are underway.

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#### A.13 Planar transformer

Planar magnetic components are planar versions of conventional wire and/or foil wound magnetic components. Principal advantages of planar structure over conventional components include higher ratio of surface to volume ratio, better heat removal, smaller size, low-profile shape, better predictability as well as repeatability of parameters and lower leakage inductance. A planar transformer has been developed for a 1 kW power supply. The design parameters of the prototype transformer are as follows: turns ratio 6:1, number of primary and secondary turns = 18 and 3, respectively, peak flux density = 0.2, secondary RMS

current 35A. Thickness of primary and secondary lead-frames is optimized to reduce skin and proximity effect. The windings operate at current densities of 15 A/mm<sup>2</sup>. Total loss in the transformer is 25W giving 97.5% efficiency with 35°C temperature rise at full load. The transformer was fabricated using low profile planar cores type – ELP 43. The overall dimensions of the transformer are 110mm length, 70mm width and 15mm thickness. A new technique of core-extension was evolved to help reduce temperature rise, AC losses and HF shielding. Fig. A.13.1 shows the prototype development. The developed planar transformers are successfully used in laser diode driver and dipole magnet power supply for FEL. They can also be used for development of high frequency, high-power-density power supplies for various applications.



Fig. A.13.1 Planar Transformers

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#### A.14 Development of a Fast Closing Shutter

Fast Closing Shutter (FCS) is a vacuum safety device mounted on the front ends of beamline to protect the storage ring from sudden air rush from the experimental area. The FCS reduces the flow conductance. The shutter fully covers the beam aperture and permits a very low leak rate. The FCS is backed by a UHV gate valve. A prototype FCS has been developed with a total shutter closing time of 8.6msec. The shutter is closed and opened pneumatically and triggered by a solenoid coil.

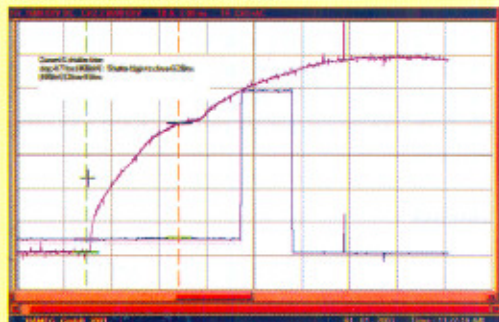


Fig. A.14.1 Out put of the shutter