

A.3: New Trigger Generator Unit for Microtron Timing Controls

Trigger generator unit has been used for generating the Master trigger (MST) and other timing instants for the operation of Microtron and associated subsystems, in a sequential manner. The earlier trigger generator had undergone many modifications to meet different requirements that came up in course of time. Requirements of new triggering instants for RF modulator were also added. The module was redesigned in Accelerator Control Section (ACS) to take care of all the new demands along with the existing requirements.



Fig. A.3.1: The Trigger Generator

The design supports generation of main accelerator trigger/Master trigger of programmable PRR (Pulse Repetition Rate). MST is derived from the 50 Hz pulse train at zero crossing instant of the cathode current. This 50 Hz signal is scaled down to 1 Hz in synchronism to zero crossing instant. MST is sent to Indus-1 timing control system, which in turn generates a delayed trigger for the beam injection and sends it back to trigger generator.

The delayed trigger is sent to RF modulator after isolation by trigger generator. Programmable pre trigger with respect to MST and delayed trigger with respect to modulator trigger are also generated. All the trigger outputs are of TTL level with 50 driving capacity. Galvanically isolated outputs are used to meet both channel-to-channel and input to output isolation. Multiple trigger outputs are generated for each trigger signal. Normal and diagnostics modes of operation, along with selectable trigger on/off facility have been provided. All the triggers are qualified with good system interlock conditions at normal mode. In diagnostics mode, only MST and delayed trigger are produced locally to perform any test but modulator trigger is not generated.

The developed trigger generator is modular in nature. Different boards have been designed for generating different timing instants. These boards are connected via a common back plane. All the trigger signals are made available at the backplane. With this, the system expandability becomes

easier. I/O connectivity, test points, LED indications and control push buttons are provided on the front panel. The trigger generator has been deployed in Microtron Control System after a rigorous testing in lab and is working satisfactorily. Measured rise time of trigger outputs with 100 meter cable on 50 termination is ~ 40ns. Jitter and voltage drop are measured as less than 10 ns and 12% respectively.

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A.4: Development of Pulsed Kicker Magnets for Indus-2

Injection system of Indus-2 consists of Pulsed thin & thick septum magnets and four Kicker Magnets. Injection of 600 MeV electrons into the Storage ring in the horizontal plane is carried out by combination of these pulsed magnets. In this report, a brief overview of Pulsed Kicker magnet development for injection of 600 MeV electrons into Indus-2 ring is given.

Window type, electrically lumped kicker magnets are chosen on the basis of good field spatial homogeneity, low leakages, & pulser simplicity. Magnetic design simulation have been carried out using Flux2D & transient OPERA 3D. Main parameters of kicker magnets are shown in Table A.4.1.

Each magnet has been constructed in window frame, single turn coil with Ni-Zn-Co ferrites mounted around ceramic chamber Their assembly details are shown in Fig. A.4.1.

Table A.4.1: Main parameters of the kicker magnets

Injection Energy	700 MeV
Magnet deflection	25 mrad
Magnet aperture	130 mm H x 65 mm V
Magnet length	300 mm
Magnet field	0.22 T at @11 KA
Magnet pulse field shape	Half sine wave - 3 ms

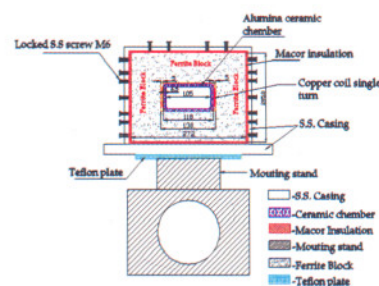


Fig. A.4.1: Cross section of Kicker magnet