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Design of heliostat drive unit for the total solar eclipse expedition of 24 October 1995

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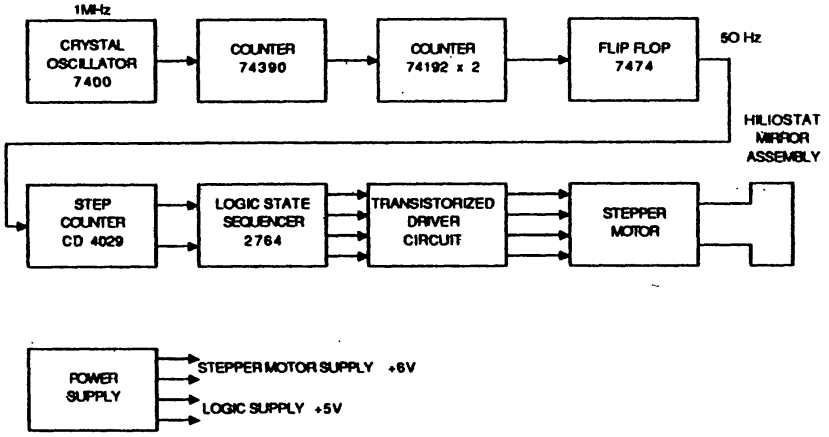
A single miror heliostat is essentially a plane mirror on an equatorial mount which tracks the Sun to provide a stationary and accessible image for the instrumental set up. The tracking is accurately done by a stepper motor driven at a fixed rate. The unique feature of this drive unit is the state generator circuitry which controls the half step, full step, forward and reverse direction and the speed. This is achieved by using an EPROM IC which is programmed according to the requirement in which the program may be selected by a switch. The power driving section simply receives this sequential information from EPROM. The driver circuit is designed for the control of almost any four-pole stepper motor.

The stepper motor drive unit which drives the heliostat is operated by electronic circuit which consists of (1) pulse generator circuit (2) logic step sequencer circuit and (3) transistorized driver circuit.

The stepper motor drives were used with two alternative mechanisms : 1) Gear reduction as available directly on parsec commercial drive. 2) Horse-shoe mirror mounts with friction drive reduction (made locally). These units were successfully used during the total solar eclipse observations on 24 October 1995 at Nim Ka Thana.



Block diagram of heliostat stepper motor control drive unit