



MULTIPLE MIRROR TELESCOPE OBSERVATORY

Smithsonian Astrophysical Observatory and Steward Observatory, University of Arizona

MMTO Technical Memorandum 85-2

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Subject: THE IRIS SYSTEM FOR THE MULTIPLE MIRROR TELESCOPE

I. INTRODUCTION

The Iris System for the MMT consists of six iris diaphragms, one for each telescope, mounted on the Optical Support Structure (OSS) between the tertiary mirrors and the beamcombiner. The irises can be fully opened, fully closed or stepped to intermediate positions to independently reduce or eliminate the beam from each telescope. During phasing experiments, the Iris System can block the images from all of the telescopes except for the two that are being phased; and for engineering experiments, it can allow the viewing of the image from one telescope when all six telescopes are coaligned on a star in the center of the field. The irises can also provide sky masking in addition to or instead of the light baffles around the secondary mirrors. The operator uses a remote hand paddle to control the stepper motors that drive the irises open and closed. This memo will describe in detail the electronics and the mechanics of the Iris System, including a discussion of problems encountered, their solutions, maintenance recommendations and possible improvements.

II. ELECTRONIC SYSTEM

Under control of a remote hand paddle, the electronics for the Iris System generate drive pulses for the stepper motors that open and close the iris diaphragms. The electronics is comprised of two sections: the controller and the set of drivers.

A. Controller

The controller interfaces the operator's hand paddle to the drivers and the iris assemblies. Switch settings on the hand paddle determine how many steps to issue to the stepper motors, which stepper motors will be enabled to drive the irises and whether the irises will open or close. The controller reads the switch setting and produces the appropriate number of pulses (four step increments are available: 4608, 1024, 256 and 64). Again utilizing switch settings, the controller directs the pulses to the drivers associated with the enabled irises. Two momentary contact switches on the hand paddle, one for open and one for close, initiate the pulse generation and supply the drivers with the direction of travel. The controller arbitrates between the open command and the close command with close being given higher priority if both should occur simultaneously and with both being ignored while a previous command is in progress. Travelling from fully open to fully closed, or vice versa, requires 4608 steps. The other step numbers enable a rough setting of the iris aperture in intermediate positions. The controller disables an iris when that iris' mechanism contacts a microswitch located at the limit of travel for the open command. No microswitch disables the driver at the limit of travel for the close command; instead the excess pulses are essentially ignored since motion stops when the stepper motor stalls at the iris' fully closed position. To avoid needless heat