

FTS Electronics Improvements

Between December 1990 and February 1991, three series of test were conducted to investigate the following instrument performance problems.

1. Servo Unlocks

Loss of servo lock occurred most frequently during very long scans (16000 steps and over), although the problem has been reported with no carriage motion.

2. Missing Data

A problem never seen before, the interferogram signal disappeared for a short period of time.

3. Reference Laser Signals Low

After replacing the reference laser and realigning the optics, the Lissajous ellipse showed reduced amplitude. An increase in reference detector amplifier gain was proposed to offset the loss.

4. Missing Steps

Although infrequent, a few instances of what has been called "missing steps" were observed. This anomaly could be better described as servo motion glitches and causes discontinuities in interferograms of a CW source.

Results

1. Servo Unlocks

Extensive troubleshooting showed that the ADDER card, responsible for servo error signal generation, was occasionally latching spurious data at its output. This caused the Digital-to-Analog converter to introduce a near full-scale error voltage into the loop, driving the carriage out of lock. After replacing this card with an upgraded version, the rate of unlocks was dramatically reduced. Also, a backlash problem in the carriage coupling to the drive screw was discovered. The resulting servo perturbations were severe and several unlocks were noted when the carriage changed direction at the end of a scan. A mechanical adjustment to remove the backlash corrected unlocks at car-

riage scan reversals. Further tests will determine if this problem has been completely eliminated.

2. Missing Data

We could not reproduce a similar event, either before or after the Adder card replacement. Analysis of this phenomenon is difficult, but it could be related to the weakening of the reference laser signals or autogain control problems.

3. Reference Laser Signals Low

The gain on the line drivers for the reference laser signals was boosted by a factor 2. Although the Lissajous ellipse showed the signals restored to previous levels, no improvement in operation has been attributed to the change.

4. Missing Steps

The rate of missing steps is rather low compared to servo unlocks and correspondingly more difficult to investigate. However, it is suspected that the carriage coupling backlash may have subjected the carriage to significant shocks which could produce a step anomaly without throwing the servo out of lock. If this hypothesis is correct, the missing step problem has already been corrected by elimination of carriage backlash.

As knowledge and experience are gained on this complex instrument, further performance improvements should be possible. However, optimum operation and reliability will only be achieved through constant troubleshooting effort and a comprehensive maintenance program.

J. Horne, P. Papsian

Retirement of Photographic Plates

Subsequent to the Fall, 1990, meeting of the Scientific Advisory Council, CFHT has now decommissioned the photographic camera facility, effective June 30, 1991. The camera hardware will be either mothballed or even destroyed, and we will proceed to dispose of the existing stock of plates. A small lab capable of acting as a darkroom will be maintained, otherwise, the existing darkroom will probably be converted for other purposes, such as support of the MOS/SIS.

J. Glaspey

RECENT TECHNICAL ACTIVITIES

Generation III CCD Controller Progress Report

At the time of this writing the new CCD controller system is nearly ready for its first power-on tests. All of the hardware is in hand and the final packaging of the first unit is nearing completion. The first test will be to successfully operate a retired Thompson CCD in all modes including sub-arrayed and binned imaging. Following a thorough shake down with this CCD, phase I will continue with emphasis shifting towards operating the Lick1 2048x2048 and the JPL1 1024x1024 devices.

Phase I calls for a single amplifier readout of the Lick1 device in less than 3 minutes in a fully integrated data acquisition

system. This system includes a dual monitor display (one for control and one for image display and plots), a faster user interface along with all of the previous instrument interfaces. The addition of a faster, blue sensitive 2048x2048 CCD (Lick2) should help to further reduce the CCD readout overhead to less than 2 minutes. A dual-amplifier readout developed in phase II should reduce this again by a factor of two.

While lab testing of the complete system will begin shortly, a target date of June 19 has been set for the first telescope-based tests to begin. A full complement of engineering tests will be conducted in the telescope environment on that date to study noise susceptibility and overall performance. If all goes well it is hoped that a phase I version of the system can be released for general use by semester I, 1992.

C. Clark, S. Massey, D. Josephson