BiSON Birmingham Solar-Oscillations Network

TECHNICAL REPORT NO. 386

Mount controller repairs at Las Campanas in 2017 November

Steven J. Hale
The University of Birmingham, Edgbaston, Birmingham B15 2TT

2017 December 22

This technical report series is published by:

THE UNIVERSITY OF BIRMINGHAM

High-Resolution Optical-Spectroscopy Group

School of Physics and Astronomy
The University of Birmingham
Edgbaston, Birmingham B15 2TT, United Kingdom
Telephone: +44-121-414-4551

Mount controller repairs at Las Campanas in 2017 November

Steven J. Hale

The University of Birmingham, Edgbaston, Birmingham B15 2TT

2017 December 22

Abstract

Problems with the mount encoder position values and the RA drive were investigated and found to be caused by corrosion around the encoder header connectors on the PCB, and general dirt brought in by the cooling fan. The mount controller and RA motor were replaced with spares from Birmingham, resolving all faults. The delta-B module was decommissioned.

Contents

1 Introduction

Steven Hale visited Las Campanas from 2017 November 20 to December 2. The most recent previous visit was in 2015 April where a new-style temperature controller was installed [1]. Section 2 looks at problems with the mount controller. Section 3 discusses decommissioning of the delta-B function. Finally, Section 4 logs some general maintenance.

2 Mount Controller

The mount RA position encoder has been working erratically for some time, later followed by similar symptoms from the declination position encoder. The problem was mitigated by increasing the allowed "slop" in the position value, but eventually the RA drive motor also started to fail and so a permanent solution was required.

The LCO technical staff had previously investigated all possible faults, replacing the RA encoder, checking the cable continuity, even replacing the peripheral DIO ICs on the mount

controller main board. No problems were found. On this visit, the mount controller and RA drive motor were replaced with spares from Birmingham, resolving all faults. The new unit was installed on 2017 November 22.

The two encoder header connectors on the mount controller main board were found to have some minor corrosion, and this is likely causing a poor connection resulting in erratic behaviour. Likewise the motor drive outputs and flyback diodes are covered in dirt brought in by the cooling fan, and this is causing a poor connection to the motors resulting in poor motor performance. The mount controller has been shipped back to Birmingham, and is expected to be returned to full service after a thorough clean and solder refresh.

After installing the new controller, poor guiding performance was observed resulting in some residual oscillation of the RA axis. The RA motor and gearbox were replaced with spares from Birmingham on 2017 November 25, and the guiding performance returned to normal. The original motor has noticeably increased backlash through general wear.

3 Delta-B

At all other sites the delta-B module has either failed or been removed. Since data from the delta-B function has never been used, the module has also been decommissioned at Las Campanas. The delta-B module was disabled on the evening of 2017 November 22. The first full day of data without the module running was 2017 November 23.

4 Misc

The dome and computer UPS devices were tested during two power outages while LCO installed a new mains frequency-converter motor-generator. Both units operated correctly.

The dome camera failed some time ago. The fault appears to be with the power supply rather than the camera itself. The power supply has been removed in order to source a similar replacement.

A lot of very old hardware and empty boxes have been removed from the dome for disposal. The work areas are now clear for use.

The porch area of the dome has a fly infestation problem, mostly around the external door. The dome has been sprayed with RAID and the issue should be monitored on an ongoing basis.

References

[1] Hale, S. J. New temperature controller for Hannibal in Las Campanas in 2015 April. *BiSON Technical Report Series,* Number 373, High-Resolution Optical-Spectroscopy Group, University of Birmingham, UK, 2015. URL `http://epapers.bham.ac.uk/2068/`. [page 1]