

VERY LARGE TELESCOPE

<p>DIMM LCU, Hardware Functional Description.</p>
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Doc.: VLT-TRE-ESO-xxxxx-yyyy
Issue: Draft 1
Date: 17 Dec. 1996

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File: C:\WINWORD\DOCS\DIMM\FUNC.DOC

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CHANGE RECORD.

Issue:	Date:	Section/Page affected:	Comments:
Draft 1	17 Dec. 1996	All:	First draft.

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1. INTRODUCTION

The VLT DIMM LCU controls the Eta axis, Theta axis and the Dome of the DIMM telescope. This document gives the overview of all hardware functions that are supported.

The LCU consists of:

- 2 amplifiers with integrated velocity controller.
- electronic hardware for interfacing.
- interlock logic.
- a thermal control unit
- a VME computer

The original DIMM motor assembly, as produced by AMOS, has been upgraded. See for details the doc 'DIMM upgrade plan'.

2. TELESCOPE

2.1. AMPLIFIER

The Eta and Theta axis have an amplifier with integrated velocity loop.
The actual torque signal of each amplifier is made available to the s/w for monitoring.

2.2. ENCODER

The encoder is interfaced to the Heidenhain IK 320 card.

2.2.1. INITIALISATION

The encoder needs to be initialised after power up. The LCU must command the axis to move. When the init mark is detected, the LCU must move the axis away from the init mark in a given direction until 'init mark false' is detected. Then, the axis must continue the same direction until the first zero pulse of the encoder is detected. This initialises the encoder.
The init sequence for Eta and Theta after power up is described in xx.

2.3. INTERLOCK

2.3.1. GENERAL

The interlock is made according to the requirements in the Electr. Design Spec (VLT-SPE-ESO-10000-0015). From a functional point of view, the interlock of each axis is controlled (by the h/w!) according to the following logic flow:

```
IF ( (a h/w or s/w enable command is true)
      AND (all interlock conditions show OK status) ) THEN
      (switch power to the amplifiers on)
ENDIF
IF (amplifier power is OK) THEN
      (a VME input signal is set).
ENDIF
```

The interlock conditions are t.b.d xxxx. Collision detect, horizon detect.

Most interlock conditions are not latched, i.e. they show the momentary status. It is therefore important that the s/w monitors the interlock status cyclic and reset the enable bit in the case of an interlock condition. This prevents uncontrolled restarts.

2.3.2. MANUAL CONTROL

Manual control in velocity control is done with a selection switch from the front panel. The status of this switch is available in the LCU s/w.

3. DOME

t.b.d.

4. CABINET THERMAL CONTROL

The following is t.b.d., depending on the location of the electronics:

The thermal control of the LCU cabinet is made according the Electr. Design Spec. This means in short:

- The h/w uses a temperature reference based on the air temperature around the cabinet.
- The s/w can add an offset to that value.
- The status of the thermal control is available to the s/w.
- In case of excessive high temperature, the cabinet is switched of by the h/w. This includes the VME computer of the LCU.

5. VME COMPUTER

All functions are implemented on a VME computer, consisting of:

- 1 standard CPU.
- 1 standard TIM.
- 1 standard digital I/O.
- 1 standard analog I/O (16 inputs, 2 outputs).
- 1 standard serial I/O (8 ports).