

# **BiSON** Birmingham Solar-Oscillations Network

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## **The Replacement of the Blind Motor and the Connection of the Station to the Internet in Narrabri in 2000 March**

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2000 August 14

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# The Replacement of the Blind Motor and the Connection of the Station to the Internet in Narrabri in 2000 March

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## Abstract

I visited Narrabri from 2000 March 17 to March 22. I replaced the blind motor and connected the station to the Internet. I looked at the V/F problem, but was not able to fix it.

## 1 Introduction

I visited Narrabri from 2000 March 17 to March 22. This was a very short trip—there were only five full days in which to do all of the work.

The main reason for visiting Narrabri was to fix the blind motor. It had stopped working on 2000 February 24. Aside from this, I also hoped to connect the station to the Internet and to fix the new V/F problem.

## 2 Blind Motor

Because Ben was unable to make any progress at all in fixing the blind motor, we were not able to tell ahead of time which component was at fault. Therefore I took several items from the Birmingham dome (the blind motor, two limit switches, a junction box, and the motor-run capacitor).

It was the blind motor that had failed.

I swapped the broken Narrabri blind motor for the working Birmingham one [1]. The broken motor was returned to Birmingham where Hugh Williams had it rewound by A.E.S. Limited for £250.00.

### 3 Internet

On this trip I managed to re-establish our dome's connection to the Internet. The problem was with the settings on their terminal server. Our line speed is set to 9600 baud, which is rather slow. This is to make sure we do not put too much traffic on their network.

We connect to the Internet through an RS-485 link to a terminal server. The details of the connection can be found in BTR-54.

It may be useful to have a description of the pins used by Ben Reddall's RS-232-to-RS-485 converters. In RS-232, pin 2 is *transmit* and pin 3 is *receive*. The DTE transmits on the *transmit* pin and the DCE transmits on the *receive* pin. In Ben's boxes, *transmit* is the pair 12 and 24, *receive* is the pair 13 and 25.

There is a new gateway in Narrabri: *nar.gw.csiro.au* is 192.207.156.5.

### 4 V/F Problem

The V/F problem has reappeared on the starboard side. This problem has been with us for some time now and you can read about it in many reports [3, 2, 4]. In 1997 June, Richard Lines solved the problem [4] by putting Schmitt triggers on the scaler inputs. We thought this had cured the problem for good, but it came back on 1999 October 12.

I had very little time to look at the problem on this trip. In the few days that I was on site, everything was working well. As expected, the problem returned shortly after I left.

A description of the Schmitt triggers can be found in BTR-61. Richard actually used a 4011, and not a 4049 like he described in the report.

Richard was concerned about the numbers of counts seen when the input is held high; they were 600 and 600. There should be 300 counts in each scaler because the gates open and close 300 times during a counting cycle. On this trip, I observed 300 counts from each scaler. If Richard was looking at the computer screen, he would have seen 600 counts — this is the sum.

### 5 Footprint

My only test on the Footprint during this trip was to change the gate module from *double* mode to *single* mode. This lengthens the counting time for each gate period. *Single* and *double* refer to the number of Pockels cells in the system. There is only one Pockels cell in Narrabri.

In order to make this change, I needed to rearrange the gate-signal cables. The output signals from the gate module are shown in Table 1. The cable connections to the gate module,

**Table 1: Gate Module Outputs\***

	Single	Double
EOLM 2		
EOLM 1		
Gate rR		
Gate lR		
Gate rL		
Gate lL		

\*This information applies only to the Narrabri gate module. Other gate modules have the outputs labelled differently.

**Table 2: Gate Module Cable Connections**

	<i>Before</i>	<i>After</i>
Switch	Double	Single
EOLM 1	Velocity Pockels Cell	—
EOLM 2	—	Velocity Pockels Cell
rR	Scaler In 1	Scaler In 1
lR	Scaler In 2	Scaler In 3
rL	Scaler In 3	Scaler In 2
lL	Scaler In 4	Scaler In 4

both before my change and after, are shown in Table 2. I had to move the Pockels cell from EOLM 1 to EOLM 2 and I had to rearrange the scaler inputs.

After this change was made, the scattered sums doubled, as expected. It is not clear whether or not there is any improvement in the footprint. There may be.

The idea behind this test comes from the fact that we now believe that the problem is an offset in the difference signal [5]. This could be caused by an interaction between the V/F and the gate sequence in the scalers. By making this change, I have doubled the counting time, thus doubling the sum. However, the number of gate transitions remains the same. I had hoped that the difference-signal error would also remain the same. If that were true, then the doubled sum would cause the ratio error to decrease to half its original value.

However, the change in the gate sequence that I introduced may also affect the interaction between the V/F and gates thus muddling the results.

The next test I suggest we do is build a (possibly crude) lock-in amplifier system to measure the difference signal. If we can derive a ratio without using gated scalers, and if this eliminates the footprint, then we will have found the problem.

## 6 Water Pumps

We have a 12-V Flojet pump in Narrabri. Our PowerBox power supply had failed and Roger New sent it back for warranty repair [5]. It was now back in the dome and we reconnected it on this trip. However, it failed again less than a month after I left.

I left behind two 240-V Flojet pumps. After I left, Jock McFee purchased a Variac. Now we should be able to change over to these new pumps if we have any more problems with the 12-V ones.

## 7 Air Conditioner and UPS

On 2000 January 17, the UPS failed. Jock has ordered a new UPS Chloride Active 2kVA (AUD 2,255.00) and a new Air Conditioner (AUD 689.00) for us.

## 8 Weather Module

I updated the software so that it logs all changes to the status lines. The same changes have already been made in Las Campanas, Sutherland, and Carnarvon.

After doing this, I discovered that the RAIN and WIND lines were cut on the weather module. After fixing that, I found that they were swapped in the Keithley. I fixed that too. Now rain and wind trips are logged correctly.



Figure 1: The North Spur of the Compact Array during construction. Photograph by D. McConnell.

## 9 New Contact

Ben Reddall has decided to retire from helping us. He is still around if we need him, but the day-to-day work is going to be done by Jock McFee. Jock is now our point of contact with Narrabri, his E-mail address is *Jock.McFee@atnf.csiro.au*.

## 10 The North Spur

A new line, called the North Spur, has been built in Narrabri (see Figure 1). It is 214 m long and has five stations for antennae; this will let the array better cover the  $u-v$  plane while observing with high antenna elevations, necessary to minimize atmospheric distortion at millimeter wavelengths.

Civil works started in mid 1998 May and were scheduled to be completed by August, but were delayed by heavy rain throughout the entire construction period. By November, the new rail track was completed and one antenna had been modified to allow it to turn and travel along the north spur. In 1999, the remaining four antennae will be modified.

## References

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