

# TESTING OF ROMDAS DUAL BI CONNECTIONS

by

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**18 May 1999**

## Introduction

The ROMDAS v 4 interface was designed to allow for the use of two bump integrators (BI). However, subsequent to its production a flaw was found in the design which meant that there was a potential for the system to miss counts when operating with two BIs. A new system was therefore developed to overcome this problem. This memo presents the results of testing with the new system.

## Test Procedure

The tests were undertaken using ROMDAS Hardware Interface 157 and two ROMDAS simulators. The same simulator was used to provide the speed in all tests. This speed was sent to 53 km/h.

The simulators were set to give different number of BI counts. ROMDAS v 4.1a (Build 9) was used for the measurements. The measurements were made as follows:

- Simulator 1 – BI\_1
- Simulator 2 – BI\_2
- Both simulators connected – BI\_1 and BI\_2

A total of 50 samples were recorded with each test. The last sample was discarded due to the sampling interval being below 100 m.

Statistic	Simulator 1		Simulator 2		Both Simulators		
	Speed	BI_1	Speed	BI_2	Speed	BI_1	BI_2
Mean	53.2	556	53.3	239	53.0	554	237
S. Dev	0.4	5.4	0.4	1.8	0.2	4.6	1.9

A comparison of means test was done to test the hypothesis that there were no statistically significant differences in the means when using two BI units over the individual units. The means were not significantly different with a confidence interval > 99%.

As a result of this it is concluded that the ROMDAS dual BI system gives equivalent results to using ROMDAS with a single BI.

Table 1 gives the test data.

### Test Results

The following table summarises the results for the three tests. It will be observed that the values for BI\_1 and BI\_2 when using both simulators are virtually identical to those with the individual simulators. The differences of 2 counts for each unit could be ascribed to differences in the speeds in the three tests.

Statistic	Simulator 1		Simulator 2		Both Simulators		
	Speed	BI_1	Speed	BI_2	Speed	BI_1	BI_2
Mean	53.2	556	53.3	239	53.0	554	237
S. Dev	0.4	5.4	0.4	1.8	0.2	4.6	1.9

A comparison of means test was done to test the hypothesis that there were no statistically significant differences in the means when using two BI units over the individual units. The means were not significantly different with a confidence interval > 99%.

As a result of this it is concluded that the ROMDAS dual BI system gives equivalent results to using ROMDAS with a single BI.

**Table 1: Test Data**

Simulator 1		Simulator 2		Both Simulators		
Speed	BI_1	Speed	BI_2	Speed	BI_1	BI_2
53	556	53	239	53	554	237
0.4	5.4	0.4	1.8	0.2	4.6	1.9
54	546	53	235	53	533	236
54	547	54	235	54	544	235
53	547	54	236	53	548	233
54	548	53	236	53	549	236
54	548	53	236	54	550	240
53	548	53	236	53	550	239
54	549	53	237	53	550	238
54	550	53	237	53	551	236
53	551	53	237	53	551	237
53	551	54	237	53	551	239
53	551	53	237	53	551	237
54	553	53	237	53	551	238
53	553	54	237	53	551	238
53	554	53	237	53	552	236
53	554	54	237	53	552	237
53	555	53	237	53	552	236
53	555	53	238	53	553	237
53	556	53	238	53	553	237
53	556	54	238	53	553	236
54	556	53	238	53	554	237
53	556	53	238	53	554	235
53	556	54	238	53	554	236
53	556	54	239	53	554	237
53	557	53	239	53	554	237
53	557	53	239	53	554	235
53	557	54	239	53	554	238
53	557	53	239	53	554	236
53	557	53	239	53	555	242
53	557	53	240	53	555	239
53	558	53	240	53	555	237
54	558	53	240	53	556	239
53	559	53	240	53	556	237
53	559	53	240	53	556	235
53	560	54	240	53	556	237
53	561	53	240	53	556	237
53	561	53	240	53	557	236
53	561	53	240	53	557	239
53	561	54	240	53	557	241
53	561	53	240	53	558	237
53	562	53	240	53	558	238
53	562	54	240	53	558	239
53	563	53	241	53	558	236
53	563	53	241	53	559	236
53	564	53	241	53	559	235
53	568	53	242	53	559	234
53	568	53	242	53	560	242