

## Preface

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### LBA DAS, The Next Step

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It doesn't seem all that long ago I recorded my first radio astronomy data with the aid of a square-law detector, a "DC Amplifier" and a clockwork driven chart recorder. With much excitement the recorder gave way to an electric model (two colours!) and subsequently an ADC interfaced to a mini-computer. The latter was remarkable for its Memory Extension Unit, a 9" rack-mounted module providing all of 32k words. Spectrography was provided by a pernickety AOS.

All of the above was rendered obsolete by the introduction of the IF 'sampler' and its attendant (auto)correlator backed up by computers of unimaginable speed and capacity. (It is perhaps a delicious irony that careful observers still run a chart recorder to provide an independent record of what actually happened during an observing session.) This digitisation of the receiver backend provided power, efficiency, flexibility and most notably, stability, to data acquisition, leading to much greater dynamic range and data quality.

Now advancing technology has allowed us to take the next step, digitising the final part of the IF strip, that part of a receiver which chiefly defines the spectrum of the data. Because of its relatively narrow bandwidth this stage is traditionally responsible for the majority of amplitude, phase and delay drifts and distortions. These affect 'single dish' data directly and are doubly damaging to interferometry since they contribute significant and varying mismatches between data streams.

The introduction of digital filtering allows us to provide perfectly matched sets of filters with near ideal frequency responses, nil distortions, and the stability of atomic oscillators which provide their clock signals. The formerly separate processes of 'sampling' and interfacing to correlators and data recorders are easily integrated into the equipment. Together with the benefits of digitisation previously obtained we hope and expect this new technology will make a significant contribution to better science from our radio telescopes.

### The Manual

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As must be evident this is a collection of documents written and assembled 'on the fly' as we complete the construction and delivery of the DAS's. In time it should be replaced by a handbook in conventional format, based on the present contents and incorporating as far as possible suggestions of style, format and content from DAS users. We welcome your input!

The order of contents is introductory material at the start, day to day interactive information in the middle, and technical details towards the end. Coloured separators provide landmarks for rapid access to different sections.

### The Hardware

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This system was constructed following the experience of our pilot project "X\_FILT", a much less ambitious digital filter package still in current usage. Even so, it is inevitable users will find that new or different features would help their purpose, and the flexible nature of the technology is such that these might possibly be incorporated. Indeed some developments are already planned. Again, we welcome your input!

### Links

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DAS documents, updates : (ftp://)ftp.atnf.csiro.au/pub/people/dferri s/lba\_das/  
VLBI notes, results : (ftp://)ftp.atnf.csiro.au/pub/people/vlbi/  
The Australian Long Baseline Array (LBA)  
: http://www.atnf.csiro.au/vlbi/  
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