



HIGH LEVEL HARDWARE

ORION[†] Cambridge Ring PAD

Highlights

- Flexible configuration with 16 to 64 ports
- DMA ring interface with microcoded implementation of the CR82 P service protocol
- Firmware provides 'Orange Book' V and N services and 'Green Book' TS29 protocol
- DMA serial line controller with microcode support for all time critical line functions
- All lines auto-configurable up to 19200 baud
- Auto-answer modem control
- Configuration saved in non-volatile memory
- Unique name-server function simplifies network management
- Total measured throughput (180 byte blocks) 30 Kbytes/sec
- Approved by the JNT

Description

The PAD supports communication between RS-232 terminals and host computers attached to the Cambridge Ring (CR82). Ports may be configured for normal terminal access, to support printers or to provide reverse PAD connections to hosts with no native ring interface.

The hardware is designed to provide high performance in a flexible range of configurations. For lowest cost, a non-expandable freestanding 32 line unit is offered, whilst a range of rack mountable units provide from 16 to 64 lines (in increments of eight lines). All rack mountable units can be expanded to the full 64 lines with easily installed expansion options. Where required, a suitable cabinet is offered to convert rack mounting models into free standing units.

High performance is achieved by the combination of a 68010 main processor together with a pair of microcoded DMA channels to control the ring node and the serial line drivers. Modular construction permits easy expansion whilst simplifying maintenance.

A unique feature of these PADs is the optional name-server function. Since many rings currently lack name-servers, the first PAD installed on a ring may be configured to act as a name-server. Subsequent PADs installed on the same ring will request routing information from the first. This minimises the administrative work associated with network reconfiguration.

The name-server contains three tables (held in non-volatile storage) and divides into two basic functions. To resolve service names into ring addresses the name-server first

performs a mapping through the 'aliases' table and then a mapping through the 'services' table. A subsidiary task is the conversion of ring station addresses into machine names for which the 'machines' table is used.

Performance

The output performance of the PAD was measured by making calls from the PAD to a dedicated TS29 source connected to the same ring. The source had been programmed to put the PAD in transparent output mode and then supply a continuous stream of output. Whilst doing this it would also periodically change the block size used for the network connection and output figures for the number of blocks/sec delivered at each block size.

The range of block sizes used for the test was between 10 bytes and 180 bytes in steps of 10 bytes. Figures were taken for 1, 2, 4, 8, 16, and 32 terminals connected with all terminals set to 19200 baud.

As can be seen from the following table, with only a single terminal active, the PAD can sustain almost full line speed for any block size. Peak performance is achieved for a block size of 120 bytes or greater when 32 lines can sustain 9600 baud simultaneously.

Block Size (bytes)	Kbytes/second/port					
	1 Port	2 Ports	4 Ports	8 Ports	16 Ports	32 Ports
10	1.75	1.25	0.66	0.33	0.17	0.08
20	1.81	1.80	1.25	0.66	0.33	0.16
30	1.83	1.82	1.79	0.98	0.50	0.25
40	1.85	1.84	1.83	1.24	0.67	0.33
50	1.86	1.84	1.84	1.55	0.83	0.40
60	1.86	1.85	1.85	1.81	0.94	0.48
70	1.86	1.85	1.85	1.84	1.09	0.56
80	1.88	1.85	1.85	1.85	1.24	0.63
90	1.85	1.85	1.86	1.85	1.39	0.74
100	1.86	1.86	1.86	1.86	1.54	0.81
110	1.85	1.85	1.86	1.85	1.69	0.84
120	1.85	1.88	1.87	1.86	1.70	0.88
130	1.87	1.87	1.87	1.85	1.71	0.88
140	1.88	1.88	1.85	1.87	1.71	0.89
150	1.87	1.87	1.86	1.86	1.72	0.89
160	1.84	1.88	1.88	1.85	1.72	0.89
170	1.87	1.87	1.87	1.86	1.73	0.89
180	1.89	1.89	1.88	1.85	1.73	0.95

JNT Approval

The High Level Hardware Cambridge Ring PAD was jointly developed with the University of Kent Computing Laboratory and is recommended by the Joint Network Team (JNT) for use in the academic community.

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