MIER Communications Inc.

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LAB TESTING SUMMARY REPORT

November 1998

Report 171198

Product Category:

Carrier-Class Voice Multiplexers

Vendor Tested:

Carrier Access Corp.

Product Tested:

Access Bank I

INDEPENDENT LAB TESTED NETWORKS AS ADVERTISED™ MIER COMMUNICATIONS INC.

Key findings and conclusions:

- **Excellent throughput—handled maximum 115 Kbps per DS-0 on a channelized T1 connection**
- **Highly reliable system—performed very well in a variety of lab test scenarios**
- **Additional peripherals not required for direct connection to a T1 line**
- **Operates with a variety of high-speed modems**

Carrier Access Corp.'s Access Bank I carrier-class voice multiplexers were used extensively by Mier Communications in a support of the test bed environment used in competitive laboratory tests of remote access concentrators (RACs).The results of these RAC evaluations appeared in the April 1998 issue of *Business Communications Review* (BCR).

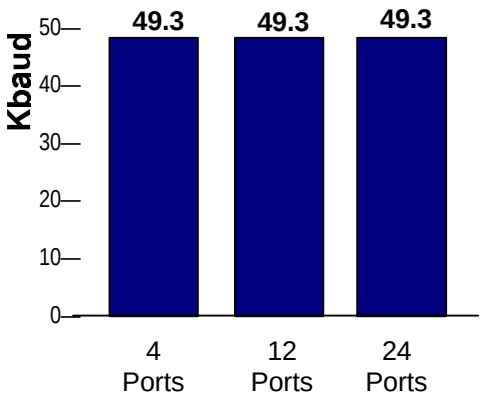
The methodology used in the evaluations was developed especially for assessing data throughput over channelized T1 links. In this evaluation, each Access Bank I was configured to aggregate up to 24 analog calls onto a digital T1 link to a switch that simulated a public switched network. (See page 2 for Test Bed set up.) Four Access Banks were used simultaneously.

Performance

Throughout our rigorous testing of 8 RAC systems (under situations where we pushed the equipment to its limits), the Access Bank I voice multiplexers performed admirably. Each of the 4 systems supported 24 ports, for a total 96 ports maximum. One RAC effectively "maxed" our multiport through put test at 115 Kbps

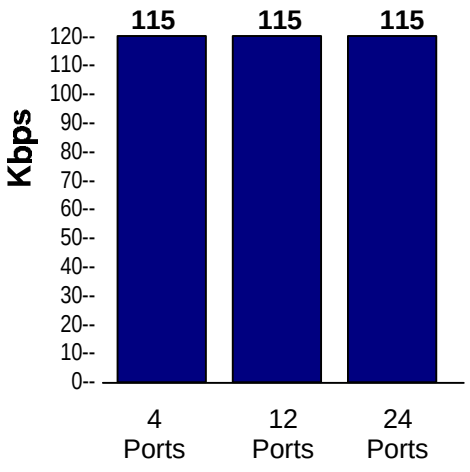
Throughput vs. Load

Average per-port download throughput (Kbps)

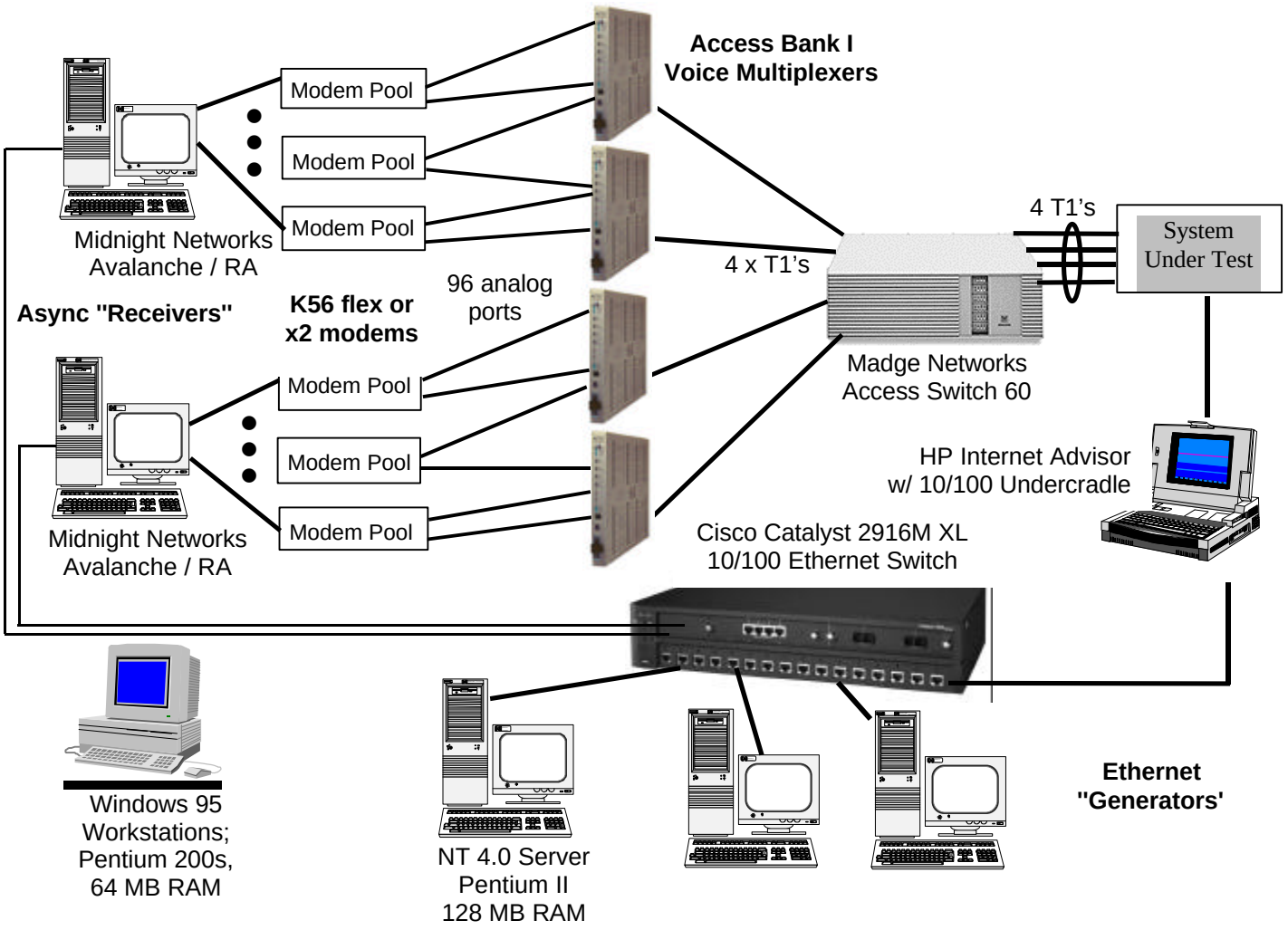


Throughput vs. Load

Average per-port download throughput (Kbps)



Test Bed Set-up



About the testing…The RAC test lab environment employed four Avalanche/RA test systems from Midnight Networks, which simulated dial-up end users. These are Pentium 200 MMX processors with 128 MB of RAM, running Linux. The systems are scripted to dial up to 96 simultaneous IP data calls, send traffic, and then calculate and track the throughput of each connection. RACs were tested over 56-Kbps modem connections. The Avalanche systems connected via RS-232 links to modem banks. From there, the analog calls (up to 96) were aggregated onto four Carrier Access Corp. Access Bank I voice multiplexers and delivered via digital T1s (up to four) to a Madge Networks AccessSwitch 60, which simulated the public switched network. The calls were then delivered to the System Under Test via 2, 3, or 4 T1s (a total of 48, 72, or 96 concurrently active modem ports). For K56 flex, two types of Hayes Microcomputer Products' Accura K56 modems were used—one with Rockwell, and the other with Lucent, chipsets. For x2, 3Com (US Robotics) MP-16 modem banks were used. Each RAC was tested with the modems the vendor preferred. At our simulated customer/ISP site, the RAC under test was connected to a Cisco 2619 MXL 10/100 switch, on a link set to operate at 100 Mbps, full-duplex. The Avalanche/RAs performed multi-port load testing, but we also tested with regular Win95 PC workstations, set up as remote clients, which dialed into a LAN-attached Windows NT 4.0 SP3 server. Besides cross-checking the Avalanche-generated calls, we used this to assess the effects of various hardware and software compression settings on throughput. The Pentium-200 Win95 (OSR2) clients performed regular FTP file transfers of both compressible ASCII text files, and non-compressible "zipped" (already compressed) binary files.

Performance - continued

per port average download capacity. The Access Bank I demonstrated that they could handle this maximum-achieved download on all 4 T1 links without errors.

Furthermore, the top-performing RAC also demonstrated that it could easily process up to 32 simultaneous call requests (8 per Access Bank I Voice Multiplexer), and also sustain up to 96 concurrent calls (24 calls per Access Bank I).

There was no noticeable performance degradation on the RAC or the Access Banks as the call load increased. (See Figure, Page 1.)

Access Bank 1: Key Features	
Interfaces supported	T1; supports fully integrated CSU
Maximum ports supported per device	24
High-speed modem connections	Yes; up to 56K per port
Framing	DS (SF) and ESF framing
Signaling levels	0 to -30dB (DS-1 or DSX-1)
Line coding	AMI or B8ZS
Loopback testing	Integral CSU network loopbacks
Call ID and distinctive ringing support	Yes
Programmable signaling; multiple circuit types	Yes; up to 5 multiple circuit types
Management system	Local or remote; Windows-based GUI; status LEDs
SNMP support	Embedded SNMP agent
Backup support	Optional battery backup
Alarms	Optional dial-out notification; visible or audible alarms

Configuration

Access Bank I Voice Multiplexers offer remote-office connectivity and access to long-distance carrier services. Operating like conventional channel banks, Access Bank I's convert a single T1 digital access link into 24 analog telephone circuits for voice, fax, and modem applications. In our laboratory tests, the Access Bank I's were connected to K56 flex modems.

Access Bank I incorporates a new generation of solid-state integrated circuits and advanced service features that incorporate configuration of the systems for FXS, FXO, and E&M signaling. They also use an Integrated Channel Service Unit (CSU) that supports a T1 line without connection to any other peripheral device or circuit cards.

Installation & Ease of Use

The Access Bank channel banks were easy to set up via a Windows-based GUI application. The systems automatically adjusted their characteristics to match those of different modems and line conditions, providing error-free, quality transmissions via high-speed modems.

The Access Bank I offers good internal diagnostics as well as external debugging capabilities via monitor jacks.

Management and Administration

Through the Windows GUI we could easily monitor the Access Banks and quickly identify any problems on the T1 links. An integrated service modem allowed remote access.

Conclusions

The Access Bank demonstrated top performance—effectively handling the highest per-port maximum download achieved (115 Kbps) on 24 ports without errors. They also employ fuse-less solid state over-voltage protection for increased reliability.

The Access Bank I offers a very high level of hardware and software integration, designed to integrate feature values and maintenance capabilities, while dramatically reducing equipment size, power, cost, and installation labor. For all businesses, the Access Bank I provides effective low cost access to carrier networks, taking advantage of competitive long distance and local services-without having to upgrade or replace existing communications equipment.

Meets Expectations

The Access Bank I Voice Multiplexers proved themselves excellent performers in a series of competitive laboratory tests of leading remote access concentrators. MierComms' recently conducted these tests and their staff rated these units highly, noting their consistency, reliability, and stability in a rigorous laboratory testing environment. In the unanimous opinion of the testers, Carrier Access Corp.'s Access Bank I carrier-class channel banks fully meet the expectations of the target user community for which they are designed and is hereby presented the "Net**WORKS** As Advertised" award.

Access Bank I

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About MIER Communications Product Testing Services…

With hundreds of its product-comparison analyses published over the years in such leading network trade periodicals as *Business Communications Review*, *Network World and Communications Week*, MIER Communications' reputation as the leading, independent product test center is unquestioned.

Founded in 1988 by Edwin E. Mier, formerly managing editor of *Data Communications* magazine and a practicing network consultant for over 20 years, the company has pioneered the comparative assessment of networking hardware and software, having developed methodologies for testing products from ATM switches to network operating systems. MIER Communications' private test services include competitive product analyses, as well as individual product evaluations. Products submitted for review are typically evaluated under the "Net**WORKS** As Advertised" program, in which networking-related products must endure a comprehensive, independent assessment of the products' usability and performance. Products that meet the appropriate criteria and performance levels receive the "Net**WORKS** As Advertised" award and MierComms Labs' testimonial endorsement.

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