COPYRIGHT © 1996 HENDERSON COMMUNICATIONS CORPORATION.
PHOTO REPRODUCTION FOR NONCOMMERCIAL USE IS PERMITTED WITHOUT PAYMENT OF ROYALTY PROVIDED THAT EACH REPRODUCTION IS DONE WITHOUT ALTERATION AND THAT THE JOURNAL REFERENCE AND COPYRIGHT NOTICE ARE INCLUDED ON THE FIRST PAGE.

The theoretical compression ratio for each of the files has been computed using the V.42 *bis* algorithm with dictionary sizes of 512, 1024, 1536, 2048, 2560, 3072, 3584 and 4096 bytes, for maximum string lengths of 6, 16, 32, 64, 128 and 250.

Description of each test file type:

EXE	an executable file (processor and operating system unknown);
GRAPHIC	a graphics metafile;
MIXED3	ASCII text, database, assembly source, and single-character files;
TEXT	document in word processor format.

MNP

The theoretical compression ratio for each of the files has also been computed for MNP5.

The following table shows the compressibility of the test files for MNP5.

File name	Size (bytes)	Compressed Size (bytes)
1.TST	983040	561112
2.TST	327680	190336
3.TST	196608	153716
4.TST	131072	146527
5.TST	524288	178179

COPYRIGHT © 1996 HENDERSON COMMUNICATIONS CORPORATION.
PHOTO REPRODUCTION FOR NONCOMMERCIAL USE IS PERMITTED WITHOUT PAYMENT OF ROYALTY PROVIDED THAT EACH REPRODUCTION IS DONE WITHOUT ALTERATION AND THAT THE JOURNAL REFERENCE AND COPYRIGHT NOTICE ARE INCLUDED ON THE FIRST PAGE.

Compressed File Size for File 5 (Bytes)

String Length	Dictionary Size 512	1024	1536	2048	2560	3072	3584	4096
6	192435	189885	200729	192744	202513	197089	190030	186304
16	161244	154731	161368	151260	156741	150060	145621	138632
32	154008	145541	150258	140830	145075	137956	133091	126738
64	152992	141404	145665	136666	139470	132286	127579	121244
128	157755	140615	146451	135502	138731	131748	125322	118319
250	158525	142686	147018	135403	138013	131273	125024	117684

COPYRIGHT © 1996 HENDERSON COMMUNICATIONS CORPORATION.
PHOTO REPRODUCTION FOR NONCOMMERCIAL USE IS PERMITTED WITHOUT PAYMENT OF ROYALTY PROVIDED THAT EACH REPRODUCTION IS DONE WITHOUT ALTERATION AND THAT THE JOURNAL REFERENCE AND COPYRIGHT NOTICE ARE INCLUDED ON THE FIRST PAGE.

Compressed File Size for File 2 (Bytes)

String Length	Dictionary Size 512	1024	1536	2048	2560	3072	3584	4096
6	146832	144262	152050	147944	156845	154037	151112	147145
16	141082	138835	143452	137085	144921	140244	136835	133358
32	140995	138101	142925	135954	142230	138346	134698	131167
64	140995	138148	142913	135904	142870	138204	134164	130668
128	140995	138148	142913	135904	142870	138204	134164	130668
250	140995	138148	142913	135904	142870	138204	134164	130668

Compressed File Size for File 3 (Bytes)

String Length	Dictionary Size 512	1024	1536	2048	2560	3072	3584	4096
6	128414	135102	145482	143213	154983	153706	152136	151273
16	127544	134313	144185	142421	153707	152398	150957	149997
32	127544	134313	144585	142421	153691	152456	151161	149976
64	127544	134313	144585	142421	153691	152456	151161	149976
128	127544	134313	144585	142421	153691	152456	151161	149976
250	127544	134313	144585	142421	153691	152456	151161	149976

Compressed File Size for File 4 (Bytes)

String Length	Dictionary Size 512	1024	1536	2048	2560	3072	3584	4096
6	131072	131072	131072	131072	131072	131072	131072	131072
16	131072	131072	131072	131072	131072	131072	131072	131072
32	131072	131072	131072	131072	131072	131072	131072	131072
64	131072	131072	131072	131072	131072	131072	131072	131072
128	131072	131072	131072	131072	131072	131072	131072	131072
250	131072	131072	131072	131072	131072	131072	131072	131072

COPYRIGHT © 1996 HENDERSON COMMUNICATIONS CORPORATION.
PHOTO REPRODUCTION FOR NONCOMMERCIAL USE IS PERMITTED WITHOUT PAYMENT OF ROYALTY PROVIDED THAT EACH REPRODUCTION IS DONE WITHOUT ALTERATION AND THAT THE JOURNAL REFERENCE AND COPYRIGHT NOTICE ARE INCLUDED ON THE FIRST PAGE.

V.42*bis*

There are various implementations of V.42 *bis* data compression in existence, and it cannot be guaranteed that all implementations will yield the same theoretical compression ratios on the five data files specified for throughput testing. For information purposes only, the compressed file sizes have been provided as measured by a V.42 *bis* implementation when there are no processor run-time limitations. This technique was used to measure the file size after compression for each of the five data files using dictionary sizes of 512, 1024, 1536, 2048, 2560, 3072, 3584 and 4096 bytes and maximum string lengths of 6, 16, 32, 64, 128 and 250 bytes. The results provided in the tables below may be used as a baseline to determine the relationship between the actual and reference throughput results.

A diskette is provided with the TSB-38 document containing these standardized data files. These files were chosen to simulate different types of data which could be transferred between dial modems in actual user applications

The following tables show the compressibility of the test files for V.42 *bis*.

Compressed File Size for File 1 (Bytes)

String Length	Dictionary Size 512	1024	1536	2048	2560	3072	3584	4096
6	302368	252603	256748	245566	260517	255311	252566	250715
16	275588	205447	186131	165708	167283	157911	149073	141110
32	276398	195772	175579	156260	155653	145456	136528	128715
64	276398	193077	171011	150933	149494	139273	132208	124869
128	276398	192020	168022	148967	148221	138880	130383	122821
250	276398	192020	168022	148967	148221	138880	130383	122821

COPYRIGHT © 1996 HENDERSON COMMUNICATIONS CORPORATION.
PHOTO REPRODUCTION FOR NONCOMMERCIAL USE IS PERMITTED WITHOUT PAYMENT OF ROYALTY PROVIDED THAT EACH REPRODUCTION IS DONE WITHOUT ALTERATION AND THAT THE JOURNAL REFERENCE AND COPYRIGHT NOTICE ARE INCLUDED ON THE FIRST PAGE.

File Transfer Protocols

This section briefly describes asynchronous-based file transfer protocols in common use today. More detailed information is contained in TIA TSB-38 or from the author/supplier of each.

XMODEM

Created by Ward Christensen (as MODEM7) this is a very simple ARQ protocol. The frame check consists of an 8-bit sum of the framed data, not a true CRC. Single control codes make up the control sequences.

XMODEM is incompatible with the XON/XOFF flow control protocol.

XMODEM was designed for use over local connections with insignificant end-to-end delays. XMODEM slows down considerably when used in large delay environments, such as long links, V.42/V.42 *bis*, and store-and-forward packet networks.

XMODEM-CRC

This XMODEM variations basically the same as XMODEM, except that it replaces the 8-bit checksum with a 16-bit CRC. The data can be 133 bytes per frame. XMODEM-CRC is incompatible with the XON/XOFF flow control protocol.

XMODEM-1K

A variation of XMODEM, XMODEM-1K uses a 16-bit CRC for frame checking. Total frame size of the data is 1,029 bytes.

XMODEM-1K is incompatible with the XON/XOFF flow control protocol.

XMODEM-1K's advantage is improved file-transfer throughput when using data connections that have significant end-to-end delay. XMODEM-1K is a good protocol for use on V.42 error-controlled connections, makes use of V.42*bis* compression when sending files containing text or graphic data.

YMODEM

YMODEM builds on XMODEM-1K to transfer information about file name, size, creation date, and other "directory" information. Otherwise, YMODEM is identical to XMODEM-1K.

COPYRIGHT © 1996 HENDERSON COMMUNICATIONS CORPORATION.
PHOTO REPRODUCTION FOR NONCOMMERCIAL USE IS PERMITTED WITHOUT PAYMENT OF ROYALTY PROVIDED THAT EACH REPRODUCTION IS DONE WITHOUT ALTERATION AND THAT THE JOURNAL REFERENCE AND COPYRIGHT NOTICE ARE INCLUDED ON THE FIRST PAGE.

YMODEM-G

YMODEM-G is used only on error-controlled circuits, the DTE must be fast and well controlled. Generally, end-to-end delay has little or no affect on data transmission.

ZMODEM

ZMODEM was developed by Chuck Forsberg for the TYMNET packet-switched network. ZMODEM transmits files in data frames containing 1024 bytes of data plus six framing characters. The data receiver only transmits during initial setup, transfer completion, and for error detection & re transmit requests. ZMODEM's frame check sequence is a 32-bit. Data frame sizes are dynamically reduced below the 1024 byte maximum, in response re transmission request rates.

ZMODEM works with file transfers that use XON/XOFF flow control.

KERMIT

Developed by Bill Catchings at CMU, this fairly complex protocol transmits only the 96 printable graphics plus a few control code characters. KERMIT has defined three frame check sequences, they are: 6-bit arithmetic sum, 12-bit CRC, and 16-bit CRC.

KERMIT accepts the use of XON/XOFF flow control

HENDERSON LABORATORIES CORPORATION

Modem Insight Report for:
Hatfield Associates - Job #-0933

Section 15

TSB-38 Throughput vs 100% Network Model Coverage
GDC Quester II vs GDC Quester II

Henderson Laboratories, Inc.
San Diego Standards Lab

Arthur L. Wallace
Director - Production

306 W. El Norte Pkwy., Ste.473
Escondido, CA 92026

(619) 739-9600 (619) 738-4202 Fax
Awallace@Henderson-Labs.Com

This page contains proprietary test results. Reproduction requires written permission from Henderson Labs.

* THROUGHPUT vs NETWORK MODEL COVERAGE *

Job No: 0933 **Date** 04/24/97

Test Model B: General DataComm Quester II **Serial No.** 1096

Reference Model A: General DataComm Quester II **Serial No.** 1097

TAS Serial No. ST24940314 **A>B, Orig A, Test B**

Test Parameters: Throughput vs Network Model Coverage

Files Used:
mdm_A_file = C:\TASKIT\15-0933A.MDM
mdm_B_file = C:\TASKIT\15-0933B.MDM
suite file = C:\TASKIT\S2_THR1.TST
suite file = C:\TASKIT\S2_THR2.TST

Notes: This page contains unsorted raw data from TAS TSB-38 Throughput tests.
Line types listed as "0" throughput = Failed to connect.
Line types listed as "0*" throughput = Connection attained, modems fail to pass 100% of the data file required by the standard.
Tests listed comprise 95% of all line types. X = Not Used For 95% Tests.

LINE	TLC1	TLC2	TLC3	TLC4	TLC5	TLC6	TLC7
17C	88,200	88,200	81,400	88,200	81,400	74,000	74,600
18C	88,200	88,200	81,400	88,200	81,400	67,900	74,600
19C	81,400	81,400	74,700	81,400	74,700	67,900	67,900
20C	74,600	74,600	67,900	74,600	67,900	61,100	67,900
21C	95,000	95,000	88,200	95,000	81,500	74,700	81,500
17B	78,500	75,400	73,400	58,500	67,900	67,900	62,500
17A	70,900	68,900	67,900	55,400	67,900	67,900	66,800
23C	80,900	80,800	74,700	80,100	67,900	67,900	67,900
24C	74,700	80,000	67,900	74,700	67,900	61,100	67,900
18B	81,400	80,700	74,000	76,600	73,300	67,900	69,600
18A	68,600	37,800	67,900	53,500	67,900	61,100	67,900
22C	81,400	88,200	74,700	88,200	74,600	61,100	74,600
19B	74,000	71,800	67,300	62,300	67,900	61,000	67,300
19A	66,800	57,900	67,900	60,300	61,100	61,100	61,100
21B	95,000	95,000	81,500	88,200	81,500	67,900	55,200
21A	88,200	95,000	74,700	88,200	74,700	61,100	74,700
20B	67,900	61,200	61,100	66,100	61,100	61,100	61,100
20A	66,700	36,800	61,100	52,900	61,000	54,300	60,500
23B	61,100	61,100	54,400	61,100	61,100	47,600	54,300
23A	54,400	54,400	40,800	47,600	47,600	40,800	47,600
24B	67,300	67,900	60,900	67,900	61,100	54,300	61,100
24A	60,900	61,000	54,300	61,100	54,300	47,500	43,000
22B	81,400	81,400	74,600	81,400	74,600	67,900	74,600
22A	74,000	69,200	67,900	73,300	67,900	54,300	67,900

This page contains proprietary test results. Reproduction requires written permission from Henderson Labs.

* THROUGHPUT TEST CONNECT SPEEDS *

Job No: 0933 **Date** 04/24/97

Test Model B: General DataComm Quester II **Serial No.** 1096
Reference Model A: General DataComm Quester II **Serial No.** 1097

TAS Serial No. ST24940314 **A>B, Orig A, Test B**

Test Parameters: Throughput vs Network Model Coverage
Files Used:
mdm_A_file = C:\TASKIT\15-0933A.MDM
mdm_B_file = C:\TASKIT\15-0933B.MDM
suite file = C:\TASKIT\S2_THR1.TST
suite file = C:\TASKIT\S2_THR2.TST

Notes: This page contains connect speeds in BPS from TAS TSB-38 Throughput tests.
Line types listed as "0" throughput = Failed to connect.
Line types listed as "0*" throughput = Connection attained, modems fail to pass 100% of the data file required by the standard.
Tests listed comprise 95% of all line types. X = Not Used For 95% Tests.

LINE	TLC1	TLC2	TLC3	TLC4	TLC5	TLC6	TLC7
17C	31,200	31,200	28,800	31,200	28,800	26,400	26,400
18C	31,200	31,200	28,800	31,200	28,800	24,000	26,400
19C	28,800	28,800	26,400	28,800	26,400	24,000	24,000
20C	26,400	26,400	24,000	26,400	24,000	21,600	24,000
21C	33,600	33,600	31,200	33,600	28,800	26,400	28,800
17B	28,800	28,800	26,400	28,800	24,000	24,000	26,400
17A	26,400	28,800	24,000	26,400	24,000	24,000	24,000
23C	28,800	28,800	26,400	28,800	24,000	24,000	24,000
24C	26,400	28,800	24,000	26,400	24,000	21,600	24,000
18B	28,800	28,800	26,400	28,800	26,400	24,000	26,400
18A	28,800	28,800	24,000	28,800	24,000	21,600	24,000
22C	28,800	31,200	26,400	31,200	26,400	21,600	26,400
19B	26,400	26,400	24,000	26,400	24,000	21,600	24,000
19A	24,000	24,000	24,000	24,000	21,600	21,600	21,600
21B	33,600	33,600	28,800	31,200	28,800	24,000	28,800
21A	31,200	33,600	26,400	31,200	26,400	21,600	26,400
20B	24,000	24,000	21,600	24,000	21,600	21,600	21,600
20A	24,000	24,000	21,600	24,000	21,600	19,200	21,600
23B	21,600	21,600	19,200	21,600	21,600	16,800	19,200
23A	19,200	19,200	14,400	16,800	16,800	14,400	16,800
24B	24,000	24,000	21,600	24,000	21,600	19,200	21,600
24A	21,600	21,600	19,200	21,600	19,200	16,800	19,200
22B	28,800	28,800	26,400	28,800	26,400	24,000	26,400
22A	26,400	28,800	24,000	26,400	24,000	19,200	24,000

This page contains proprietary test results. Reproduction requires written permission from Henderson Labs.

* THROUGHPUT TEST RESULTS *

Sorted by Throughput

Job No:	**0933**		**Date 04/24/97**
Test Model B:	**General DataComm Quester II**	**Serial No.**	**1096**
Reference Model A:	**General DataComm Quester II**	**Serial No.**	**1097**
TAS Serial No. ST24940314		**A>B, Orig A, Test B**	

Test Parameters: **Throughput vs Network Model Coverage**

Files Used:
mdm_A_file = C:\TASKIT\15-0933A.MDM
mdm_B_file = C:\TASKIT\15-0933B.MDM
suite file = C:\TASKIT\S2_THR1.TST
suite file = C:\TASKIT\S2_THR2.TST

Notes: This page contains data from TAS TSB-38 Throughput tests sorted by value.
Line types listed as "0" throughput = Failed to connect.
Throughput = Measured throughput in bits per second.
Speed = Connect speed.
Tests listed comprise 95% of all line types. X = Not Used For 95% Tests.

Line	Throughput	Speed			Line	Throughput	Speed
23a2	36,800	19,200			23b4	60,900	21,600
20a2	36,800	24,000			24a2	61,000	21,600
18a2	37,800	28,800			20a5	61,000	21,600
23a3	40,800	14,400			19b6	61,000	21,600
23a6	40,800	14,400			20c6	61,100	21,600
24a7	43,000	19,200			23b1	61,100	21,600
24a6	47,500	16,800			19a5	61,100	21,600
23a4	47,600	16,800			23b2	61,100	21,600
23a5	47,600	16,800			24c6	61,100	21,600
23b6	47,600	16,800			20b3	61,100	21,600
23a7	47,600	16,800			20a3	61,100	21,600
20a4	52,900	24,000			20b5	61,100	21,600
18a4	53,500	28,800			18a6	61,100	21,600
24a3	54,300	19,200			24a4	61,100	21,600
24a5	54,300	19,200			22c6	61,100	21,600
20a6	54,300	19,200			24b5	61,100	21,600
24b6	54,300	19,200			23b5	61,100	21,600
23b7	54,300	19,200			19a6	61,100	21,600
22a6	54,300	19,200			19a7	61,100	21,600
23b3	54,400	19,200			21a6	61,100	21,600
21b7	55,200	28,800			20b6	61,100	21,600
17a4	55,400	26,400			20b7	61,100	21,600
19a2	57,900	24,000			24b7	61,100	21,600
17b4	58,500	28,800			20b2	61,200	24,000
19a4	60,300	24,000			19b4	62,300	26,400
20a7	60,500	21,600			17b7	62,500	26,400
24a1	60,900	21,600			20b4	66,100	24,000
24b3	60,900	21,600			19a1	66,800	24,000

This page contains proprietary test results. Reproduction requires written permission from Henderson Labs

* THROUGHPUT TEST RESULTS *

Sorted by Throughput

Job No:	**0933**		**Date 04/24/97**
Test Model B:	**General DataComm Quester II**	**Serial No.**	1096
Reference Model A:	**General DataComm Quester II**	**Serial No.**	1097
TAS Serial No. ST24940314		**A>B, Orig A, Test B**	

Test Parameters: **Throughput vs Network Model Coverage**

Files Used:
mdm_A_file = C:\TASKIT\15-0933A.MDM
mdm_B_file = C:\TASKIT\15-0933B.MDM
suite file = C:\TASKIT\S2_THR1.TST
suite file = C:\TASKIT\S2_THR2.TST

Notes: This page contains data from TAS TSB-38 Throughput tests sorted by value.
Line types listed as "0" throughput = Failed to connect.
Throughput = Measured throughput in bits per second.
Speed = Connect speed.
Tests listed comprise 95% of all line types. X = Not Used For 95% Tests.

Line	Throughput	Speed			Line	Throughput	Speed
17a7	66,800	24,000			18a7	67,900	24,000
24b1	67,300	24,000			24b4	67,900	24,000
19b3	67,300	24,000			21b6	67,900	24,000
19b7	67,300	24,000			22a3	67,900	24,000
20c3	67,900	24,000			22a5	67,900	24,000
20c5	67,900	24,000			22b6	67,900	24,000
17a3	67,900	24,000			22a7	67,900	24,000
18c6	67,900	24,000			18a1	68,600	28,800
23c7	67,900	24,000			17a2	68,900	28,800
17b5	67,900	24,000			22a2	69,200	28,800
17a5	67,900	24,000			18b7	69,600	26,400
24c3	67,900	24,000			17a1	70,900	26,400
19c6	67,900	24,000			19b2	71,800	26,400
18a3	67,900	24,000			18b5	73,300	26,400
23c5	67,900	24,000			22a4	73,300	26,400
24c5	67,900	24,000			17b3	73,400	26,400
19c7	67,900	24,000			17c6	74,000	26,400
20b1	67,900	24,000			19b1	74,000	26,400
18a5	67,900	24,000			18b3	74,000	26,400
20c7	67,900	24,000			22a1	74,000	26,400
19a3	67,900	24,000			20c1	74,600	26,400
17b6	67,900	24,000			20c2	74,600	26,400
17a6	67,900	24,000			17c7	74,600	26,400
19b5	67,900	24,000			20c4	74,600	26,400
24b2	67,900	24,000			18c7	74,600	26,400
23c6	67,900	24,000			22c5	74,600	26,400
24c7	67,900	24,000			22c7	74,600	26,400
18b6	67,900	24,000			22b3	74,600	26,400

This page contains proprietary test results. Reproduction requires written permission from Henderson Labs.

* THROUGHPUT TEST RESULTS *

Sorted by Throughput

Job No: 0933 **Date** 04/24/97

Test Model B: General DataComm Quester II **Serial No.** 1096
Reference Model A: General DataComm Quester II **Serial No.** 1097

TAS Serial No. ST24940314 **A>B, Orig A, Test B**

Test Parameters: Throughput vs Network Model Coverage
Files Used:
mdm_A_file = C:\TASKIT\15-0933A.MDM
mdm_B_file = C:\TASKIT\15-0933B.MDM
suite file = C:\TASKIT\S2_THR1.TST
suite file = C:\TASKIT\S2_THR2.TST

Notes: This page contains data from TAS TSB-38 Throughput tests sorted by value.
Line types listed as "0" throughput = Failed to connect.
Throughput = Measured throughput in bits per second.
Speed = Connect speed.
Tests listed comprise 95% of all line types. X = Not Used For 95% Tests.

Line	Throughput	Speed			Line	Throughput	Speed
22b5	74,600	26,400			22c1	81,400	28,800
22b7	74,600	26,400			22b1	81,400	28,800
19c3	74,700	26,400			22b2	81,400	28,800
24c1	74,700	26,400			22b4	81,400	28,800
19c5	74,700	26,400			21c5	81,500	28,800
23c3	74,700	26,400			21c7	81,500	28,800
24c4	74,700	26,400			21b3	81,500	28,800
22c3	74,700	26,400			21b5	81,500	28,800
21c6	74,700	26,400			23a1	88,200	19,200
21a3	74,700	26,400			20a1	88,200	24,000
21a5	74,700	26,400			17c1	88,200	31,200
21a7	74,700	26,400			17c2	88,200	31,200
17b2	75,400	28,800			18c1	88,200	31,200
18b4	76,600	28,800			17c4	88,200	31,200
17b1	78,500	28,800			18c2	88,200	31,200
24c2	80,000	28,800			18c4	88,200	31,200
23c4	80,100	28,800			21c3	88,200	31,200
18b2	80,700	28,800			22c2	88,200	31,200
23c2	80,800	28,800			21a1	88,200	31,200
23c1	80,900	28,800			22c4	88,200	31,200
17c3	81,400	28,800			21b4	88,200	31,200
19c1	81,400	28,800			21a4	88,200	31,200
17c5	81,400	28,800			21c1	95,000	33,600
19c2	81,400	28,800			21c2	95,000	33,600
18c3	81,400	28,800			21c4	95,000	33,600
18c5	81,400	28,800			21b1	95,000	33,600
19c4	81,400	28,800			21b2	95,000	33,600
18b1	81,400	28,800			21a2	95,000	33,600

This page contains proprietary test results. Reproduction requires written permission from Henderson Labs

* THROUGHPUT TEST RESULTS *

Sorted by Line Type

Job No: 0933 **Date** 04/24/97

Test Model B: General DataComm Quester II **Serial No.** 1096

Reference Model A: General DataComm Quester II **Serial No.** 1097

TAS Serial No. ST24940314 **A>B, Orig A, Test B**

Test Parameters: Throughput vs Network Model Coverage

Files Used:
mdm_A_file = C:\TASKIT\15-0933A.MDM
mdm_B_file = C:\TASKIT\15-0933B.MDM
suite file = C:\TASKIT\S2_THR1.TST
suite file = C:\TASKIT\S2_THR2.TST

Notes: This page contains data from TAS TSB-38 Throughput tests sorted by Line type.
Line types listed as "0" throughput = Failed to connect.
Throughput = Measured throughput in bits per second.
Speed = Connect speed.
Tests listed comprise 95% of all line types. X = Not Used For 95% Tests.

Line	TLC	Throughput	Speed	Line	TLC	Throughput	Speed
17A	1	70,900	26,400	18B	1	81,400	28,800
17A	2	68,900	28,800	18B	2	80,700	28,800
17A	3	67,900	24,000	18B	3	74,000	26,400
17A	4	55,400	26,400	18B	4	76,600	28,800
17A	5	67,900	24,000	18B	5	73,300	26,400
17A	6	67,900	24,000	18B	6	67,900	24,000
17A	7	66,800	24,000	18B	7	69,600	26,400
17B	1	78,500	28,800	18C	1	88,200	31,200
17B	2	75,400	28,800	18C	2	88,200	31,200
17B	3	73,400	26,400	18C	3	81,400	28,800
17B	4	58,500	28,800	18C	4	88,200	31,200
17B	5	67,900	24,000	18C	5	81,400	28,800
17B	6	67,900	24,000	18C	6	67,900	24,000
17B	7	62,500	26,400	18C	7	74,600	26,400
17C	1	88,200	31,200	19A	1	66,800	24,000
17C	2	88,200	31,200	19A	2	57,900	24,000
17C	3	81,400	28,800	19A	3	67,900	24,000
17C	4	88,200	31,200	19A	4	60,300	24,000
17C	5	81,400	28,800	19A	5	61,100	21,600
17C	6	74,000	26,400	19A	6	61,100	21,600
17C	7	74,600	26,400	19A	7	61,100	21,600
18A	1	68,600	28,800	19B	1	74,000	26,400
18A	2	37,800	28,800	19B	2	71,800	26,400
18A	3	67,900	24,000	19B	3	67,300	24,000
18A	4	53,500	28,800	19B	4	62,300	26,400
18A	5	67,900	24,000	19B	5	67,900	24,000
18A	6	61,100	21,600	19B	6	61,000	21,600
18A	7	67,900	24,000	19B	7	67,300	24,000

This page contains proprietary test results. Reproduction requires written permission from Henderson Labs.

* THROUGHPUT TEST RESULTS *

Sorted by Line Type

Job No: 0933 **Date** 04/24/97

Test Model B: General DataComm Quester II **Serial No.** 1096

Reference Model A: General DataComm Quester II **Serial No.** 1097

TAS Serial No. ST24940314 **A>B, Orig A, Test B**

Test Parameters: Throughput vs Network Model Coverage

Files Used:
mdm_A_file = C:\TASKIT\15-0933A.MDM
mdm_B_file = C:\TASKIT\15-0933B.MDM
suite file = C:\TASKIT\S2_THR1.TST
suite file = C:\TASKIT\S2_THR2.TST

Notes: This page contains data from TAS TSB-38 Throughput tests sorted by Line type.
Line types listed as "0" throughput = Failed to connect.
Throughput = Measured throughput in bits per second.
Speed = Connect speed.
Tests listed comprise 95% of all line types. X = Not Used For 95% Tests.

Line	TLC	Throughput	Speed	Line	TLC	Throughput	Speed
19C	1	81,400	28,800	21A	1	88,200	31,200
19C	2	81,400	28,800	21A	2	95,000	33,600
19C	3	74,700	26,400	21A	3	74,700	26,400
19C	4	81,400	28,800	21A	4	88,200	31,200
19C	5	74,700	26,400	21A	5	74,700	26,400
19C	6	67,900	24,000	21A	6	61,100	21,600
19C	7	67,900	24,000	21A	7	74,700	26,400
20A	1	66,700	24,000	21B	1	95,000	33,600
20A	2	36,800	24,000	21B	2	95,000	33,600
20A	3	61,100	21,600	21B	3	81,500	28,800
20A	4	52,900	24,000	21B	4	88,200	31,200
20A	5	61,000	21,600	21B	5	81,500	28,800
20A	6	54,300	19,200	21B	6	67,900	24,000
20A	7	60,500	21,600	21B	7	55,200	28,800
20B	1	67,900	24,000	21C	1	95,000	33,600
20B	2	61,200	24,000	21C	2	95,000	33,600
20B	3	61,100	21,600	21C	3	88,200	31,200
20B	4	66,100	24,000	21C	4	95,000	33,600
20B	5	61,100	21,600	21C	5	81,500	28,800
20B	6	61,100	21,600	21C	6	74,700	26,400
20B	7	61,100	21,600	21C	7	81,500	28,800
20C	1	74,600	26,400	22A	1	74,000	26,400
20C	2	74,600	26,400	22A	2	69,200	28,800
20C	3	67,900	24,000	22A	3	67,900	24,000
20C	4	74,600	26,400	22A	4	73,300	26,400
20C	5	67,900	24,000	22A	5	67,900	24,000
20C	6	61,100	21,600	22A	6	54,300	19,200
20C	7	67,900	24,000	22A	7	67,900	24,000

This page contains proprietary test results. Reproduction requires written permission from Henderson Labs.

* THROUGHPUT TEST RESULTS *

Sorted by Line Type

Job No: 0933 — **Date** 04/24/97

Test Model B: General DataComm Quester II — **Serial No.** 1096

Reference Model A: General DataComm Quester II — **Serial No.** 1097

TAS Serial No. ST24940314 — **A>B, Orig A, Test B**

Test Parameters: Throughput vs Network Model Coverage

Files Used:
mdm_A_file = C:\TASKIT\15-0933A.MDM
mdm_B_file = C:\TASKIT\15-0933B.MDM
suite file = C:\TASKIT\S2_THR1.TST
suite file = C:\TASKIT\S2_THR2.TST

Notes: This page contains data from TAS TSB-38 Throughput tests sorted by Line type.
Line types listed as "0" throughput = Failed to connect.
Throughput = Measured throughput in bits per second.
Speed = Connect speed.
Tests listed comprise 95% of all line types. X = Not Used For 95% Tests.

Line	TLC	Throughput	Speed	Line	TLC	Throughput	Speed
22B	1	81,400	28,800	23C	1	80,900	28,800
22B	2	81,400	28,800	23C	2	80,800	28,800
22B	3	74,600	26,400	23C	3	74,700	26,400
22B	4	81,400	28,800	23C	4	80,100	28,800
22B	5	74,600	26,400	23C	5	67,900	24,000
22B	6	67,900	24,000	23C	6	67,900	24,000
22B	7	74,600	26,400	23C	7	67,900	24,000
22C	1	81,400	28,800	24A	1	60,900	21,600
22C	2	88,200	31,200	24A	2	61,000	21,600
22C	3	74,700	26,400	24A	3	54,300	19,200
22C	4	88,200	31,200	24A	4	61,100	21,600
22C	5	74,600	26,400	24A	5	54,300	19,200
22C	6	61,100	21,600	24A	6	47,500	16,800
22C	7	74,600	26,400	24A	7	43,000	19,200
23A	1	54,400	19,200	24B	1	67,300	24,000
23A	2	54,400	19,200	24B	2	67,900	24,000
23A	3	40,800	14,400	24B	3	60,900	21,600
23A	4	47,600	16,800	24B	4	67,900	24,000
23A	5	47,600	16,800	24B	5	61,100	21,600
23A	6	40,800	14,400	24B	6	54,300	19,200
23A	7	47,600	16,800	24B	7	61,100	21,600
23B	1	61,100	21,600	24C	1	74,700	26,400
23B	2	61,100	21,600	24C	2	80,000	28,800
23B	3	54,400	19,200	24C	3	67,900	24,000
23B	4	61,100	21,600	24C	4	74,700	26,400
23B	5	61,100	21,600	24C	5	67,900	24,000
23B	6	47,600	16,800	24C	6	61,100	21,600
23B	7	54,300	19,200	24C	7	67,900	24,000

This page contains proprietary test results. Reproduction requires written permission from Henderson Labs.

* THROUGHPUT TEST RESULTS *

Sorted by Likelihood of Occurrence

Job No: 0933			**Date** 04/24/97
Test Model B:	**General DataComm Quester II**	**Serial No.**	1096
Reference Model A:	**General DataComm Quester II**	**Serial No.**	1097
TAS Serial No. ST24940314		**A>B, Orig A, Test B**	

Test Parameters: **Throughput vs Network Model Coverage**

Files Used:
mdm_A_file = C:\TASKIT\15-0933A.MDM
mdm_B_file = C:\TASKIT\15-0933B.MDM
suite file = C:\TASKIT\S2_THR1.TST
suite file = C:\TASKIT\S2_THR2.TST

Notes: This page contains score data from TAS TSB-38 Throughput tests. The data is sorted according to Percentage of Coverage as stipulated in TSB-38.
Throughput = Measured throughput in bits per second.
Speed = Connect speed.
Tests listed comprise 95% of all line types. X = Not Used For 95% Tests.

Line	Percent	Throughput	Speed	Line	Score	Throughput	Speed
17c1	22.8620%	88,200	31,200	17c7	.6958%	74,600	26,400
17c2	11.4310%	88,200	31,200	23a1	.6900%	88,200	19,200
18c1	7.5440%	88,200	31,200	18b1	.6440%	81,400	28,800
17c4	4.9700%	88,200	31,200	17b2	.6440%	75,400	28,800
17c3	4.9700%	81,400	28,800	18a1	.6440%	68,600	28,800
19c1	4.2780%	81,400	28,800	17a2	.6440%	68,900	28,800
17c5	3.9760%	81,400	28,800	20c3	.4700%	67,900	24,000
18c2	3.7720%	88,200	31,200	20c4	.4700%	74,600	26,400
20c1	2.1620%	74,600	26,400	21c4	.4300%	95,000	33,600
19c2	2.1390%	81,400	28,800	21c3	.4300%	88,200	31,200
21c1	1.9780%	95,000	33,600	22c1	.4140%	81,400	28,800
18c3	1.6400%	81,400	28,800	23c2	.3910%	80,800	28,800
18c4	1.6400%	88,200	31,200	24c2	.3910%	80,000	28,800
18c5	1.3120%	81,400	28,800	20c5	.3760%	67,900	24,000
17b1	1.2880%	78,500	28,800	21c5	.3440%	81,500	28,800
17a1	1.2880%	70,900	26,400	18a2	.3220%	37,800	28,800
20c2	1.0810%	74,600	26,400	18b2	.3220%	80,700	28,800
21c2	.9890%	95,000	33,600	17b4	.2800%	58,500	28,800
19c4	.9300%	81,400	28,800	17a4	.2800%	55,400	26,400
19c3	.9300%	74,700	26,400	17b3	.2800%	73,400	26,400
17c6	.7952%	74,000	26,400	17a3	.2800%	67,900	24,000
24c1	.7820%	74,700	26,400	18c6	.2624%	67,900	24,000
23c1	.7820%	80,900	28,800	23c7	.2380%	67,900	24,000
19c5	.7440%	74,700	26,400	19b1	.2300%	74,000	26,400

This page contains proprietary test results. Reproduction requires written permission from Henderson Labs

* THROUGHPUT TEST RESULTS FILE *

Sorted by Likelihood of Occurrence

Job No: 0933			**Date** 04/24/97
Test Model B:	**General DataComm Quester II**	**Serial No.**	1096
Reference Model A:	**General DataComm Quester II**	**Serial No.**	1097
TAS Serial No. ST24940314		**A>B, Orig A, Test B**	

Test Parameters: **Throughput vs Network Model Coverage**

Files Used:
mdm_A_file = C:\TASKIT\15-0933A.MDM
mdm_B_file = C:\TASKIT\15-0933B.MDM
suite file = C:\TASKIT\S2_THR1.TST
suite file = C:\TASKIT\S2_THR2.TST

Notes: This page contains score data from TAS TSB-38 Throughput tests. The data is sorted according to Percentage of Coverage as stipulated in TSB-38.
Throughput = Measured throughput in bits per second.
Speed = Connect speed.
Tests listed comprise 95% of all line types. X = Not Used For 95% Tests.

Line	Score	Throughput	Speed	Line	Score	Throughput	Speed
19a1	.2300%	66,800	24000	18a5	.1120%	67,900	24,000
18c7	.2296%	74,600	26,400	22c3	.0900%	74,700	26,400
17b5	.2240%	67,900	24,000	22c4	.0900%	88,200	31,200
17a5	.2240%	67,900	24,000	21b2	.0805%	95,000	33,600
22c2	.2070%	88,200	31,200	21a2	.0805%	95,000	33,600
24c3	.1700%	67,900	24,000	20c6	.0752%	61,100	21,600
23c3	.1700%	74,700	26,400	22c5	.0720%	74,600	26,400
23c4	.1700%	80,100	28,800	24b1	.0690%	67,300	24,000
24c4	.1700%	74,700	26,400	23b1	.0690%	61,100	21,600
21a1	.1610%	88,200	31,200	24a1	.0690%	60,900	21,600
21b1	.1610%	95,000	33,600	21c6	.0688%	74,700	26,400
19c6	.1488%	67,900	24,000	20c7	.0658%	67,900	24,000
18b4	.1400%	76,600	28,800	21c7	.0602%	81,500	28,800
18a4	.1400%	53,500	28,800	20b2	.0575%	61,200	24,000
18b3	.1400%	74,000	26,400	20a2	.0575%	36,800	24,000
18a3	.1400%	67,900	24,000	19b4	.0500%	62,300	26,400
23c5	.1360%	67,900	24,000	19b3	.0500%	67,300	24,000
24c5	.1360%	67,900	24,000	19a3	.0500%	67,900	24,000
19c7	.1302%	67,900	24,000	19a4	.0500%	60,300	24,000
19b2	.1150%	71,800	26,400	17b6	.0448%	67,900	24,000
19a2	.1150%	57,900	24,000	17a6	.0448%	67,900	24,000
20b1	.1150%	67,900	24,000	19b5	.0400%	67,900	24,000
20a1	.1150%	88,200	24,000	19a5	.0400%	61,100	21,600
18b5	.1120%	73,300	26,400	17b7	.0392%	62,500	26,400

This page contains proprietary test results. Reproduction requires written permission from Henderson Labs.

* THROUGHPUT TEST RESULTS FILE *

Sorted by Likelihood of Occurrence

Job No: 0933			**Date** 04/24/97
Test Model B:	**General DataComm Quester II**	**Serial No.**	1096
Reference Model A:	**General DataComm Quester II**	**Serial No.**	1097
TAS Serial No. ST24940314		**A>B, Orig A, Test B**	

Test Parameters: **Throughput vs Network Model Coverage**

Files Used:
mdm_A_file = C:\TASKIT\15-0933A.MDM
mdm_B_file = C:\TASKIT\15-0933B.MDM
suite file = C:\TASKIT\S2_THR1.TST
suite file = C:\TASKIT\S2_THR2.TST

Notes: This page contains score data from TAS TSB-38 Throughput tests. The data is sorted according to Percentage of Coverage as stipulated in TSB-38.
Throughput = Measured throughput in bits per second.
Speed = Connect speed.
Tests listed comprise 95% of all line types. X = Not Used For 95% Tests.

Line	Score	Throughput	Speed	Line	Score	Throughput	Speed
17a7	.0392%	66,800	24,000	18b7	.0196%	69,600	26,400
21b4	.0350%	88,200	31,200	18a7	.0196%	67,900	24,000
21a4	.0350%	88,200	31,200	24b3	.0150%	60,900	21,600
21b3	.0350%	81,500	28,800	24b4	.0150%	67,900	24,000
21a3	.0350%	74,700	26,400	24a4	.0150%	61,100	21,600
23b2	.0345%	61,100	21,600	23b3	.0150%	54,400	19,200
23a2	.0345%	36,800	19,200	23a3	.0150%	40,800	14,400
24b2	.0345%	67,900	24,000	24a3	.0150%	54,300	19,200
24a2	.0345%	61,000	21,600	23b4	.0150%	60,900	21,600
21b5	.0280%	81,500	28,800	23a4	.0150%	47,600	16,800
23c6	.0272%	67,900	24,000	22c6	.0144%	61,100	21,600
24c6	.0272%	61,100	21,600	22c7	.0126%	74,600	26,400
20b3	.0250%	61,100	21,600	24b5	.0120%	61,100	21,600
20a3	.0250%	61,100	21,600	23b5	.0120%	61,100	21,600
20b4	.0250%	66,100	24,000	24a5	.0120%	54,300	19,200
20a4	.0250%	52,900	24,000	23a5	.0120%	47,600	16,800
24c7	.0238%	67,900	24,000	22b2	.0115%	81,400	28,800
22b1	.0230%	81,400	28,800	22a2	.0115%	69,200	28,800
22a1	.0230%	74,000	26,400	19b6	.0080%	61,000	21,600
21a5	.0224%	74,700	26,400	19a6	.0080%	61,100	21,600
18b6	.0224%	67,900	24,000	19b7	.0070%	67,300	24,000
20b5	.0200%	61,100	21,600	19a7	.0070%	61,100	21,600
20a5	.0200%	61,000	21,600	21b6	.0056%	67,900	24,000
18a6	.0196%	61,100	21,600	21a6	.0056%	61,100	21,600

This page contains proprietary test results. Reproduction requires written permission from Henderson Labs

* THROUGHPUT TEST RESULTS FILE *

Sorted by Likelihood of Occurrence

Job No: 0933			**Date** 04/24/97
Test Model B:	**General DataComm Quester II**	**Serial No.**	1096
Reference Model A:	**General DataComm Quester II**	**Serial No.**	1097
TAS Serial No. ST24940314		**A>B, Orig A, Test B**	

Test Parameters: **Throughput vs Network Model Coverage**

Files Used:
mdm_A_file = C:\TASKIT\15-0933A.MDM
mdm_B_file = C:\TASKIT\15-0933B.MDM
suite file = C:\TASKIT\S2_THR1.TST
suite file = C:\TASKIT\S2_THR2.TST

Notes: This page contains score data from TAS TSB-38 Throughput tests. The data is sorted according to Percentage of Coverage as stipulated in TSB-38.
Throughput = Measured throughput in bits per second.
Speed = Connect speed.
Tests listed comprise 95% of all line types. X = Not Used For 95% Tests.

Line	Score	Throughput	Speed				
22b3	.0050%	74,600	26,400				
22b4	.0050%	81,400	28,800				
22a3	.0050%	67,900	24,000				
22a4	.0050%	73,300	26,400				
21b7	.0049%	55,200	28,800				
21a7	.0049%	74,700	26,400				
22b5	.0040%	74,600	26,400				
22a5	.0040%	67,900	24,000				
20b6	.0040%	61,100	21,600				
20a6	.0040%	54,300	19,200				
20b7	.0035%	61,100	21,600				
20a7	.0035%	60,500	21,600				
23b6	.0024%	47,600	16,800				
23a6	.0024%	40,800	14,400				
24b6	.0024%	54,300	19,200				
24a6	.0024%	47,500	16,800				
24b7	.0021%	61,100	21,600				
23b7	.0021%	54,300	19,200				
23a7	.0021%	47,600	16,800				
24a7	.0021%	43,000	19,200				
22b6	.0008%	67,900	24,000				
22a6	.0008%	54,300	19,200				
22b7	.0007%	74,600	26,400				
22a7	.0007%	67,900	24,000				

This page contains proprietary test results. Reproduction requires written permission from Henderson Labs.

* THROUGHPUT vs LIKELIHOOD OF OCCURRENCE *

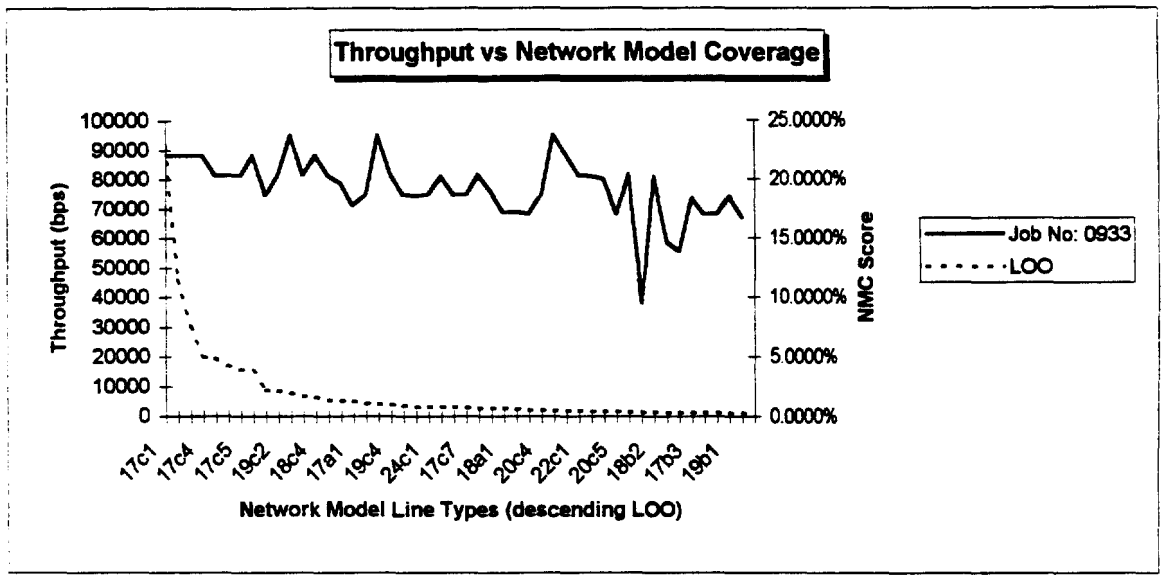
Job No: 0933			**Date** 04/24/97
Test Model B:	General DataComm Quester II	**Serial No.**	1096
Reference Model A:	General DataComm Quester II	**Serial No.**	1097
TAS Serial No. ST24940314			A>B, Orig A, Test B

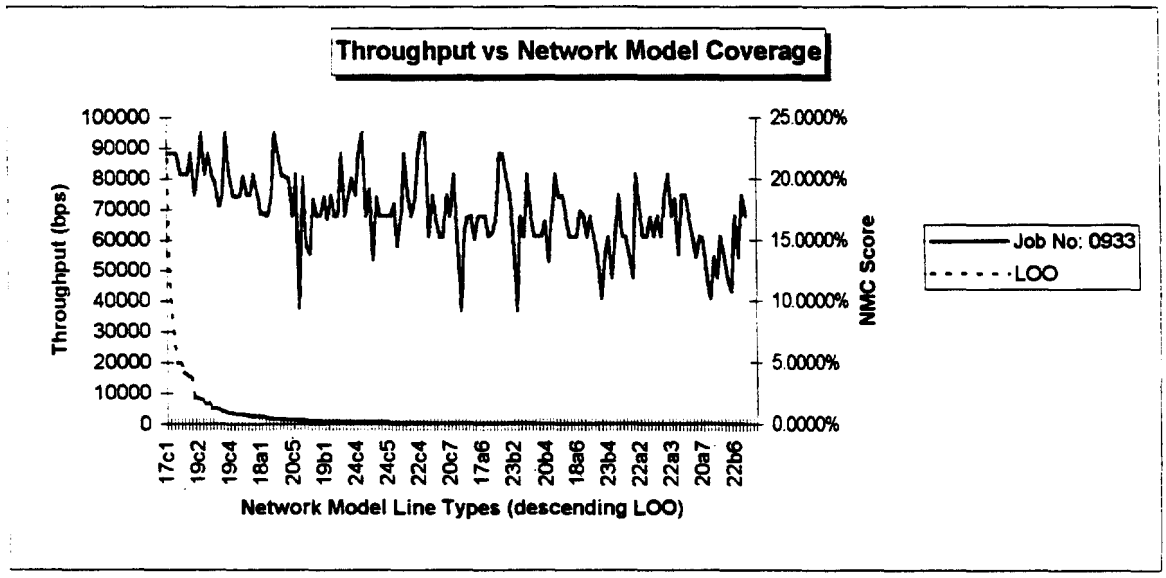
Test Parameters: Throughput vs Network Model Coverage
Files Used:
mdm_A_file = C:\TASKIT\15-0933A.MDM
mdm_B_file = C:\TASKIT\15-0933B.MDM
suite file = C:\TASKIT\S2_THR1.TST
suite file = C:\TASKIT\S2_THR1.TST

Notes: This page contains score data from TAS TSB-38 Throughput tests. The data is sorted according to Percentage of Coverage as stipulated in TSB-38.
Throughput = Measured throughput in bits per second.
Tests listed comprise 95% of all line types. X = Not Used For 95% Tests.

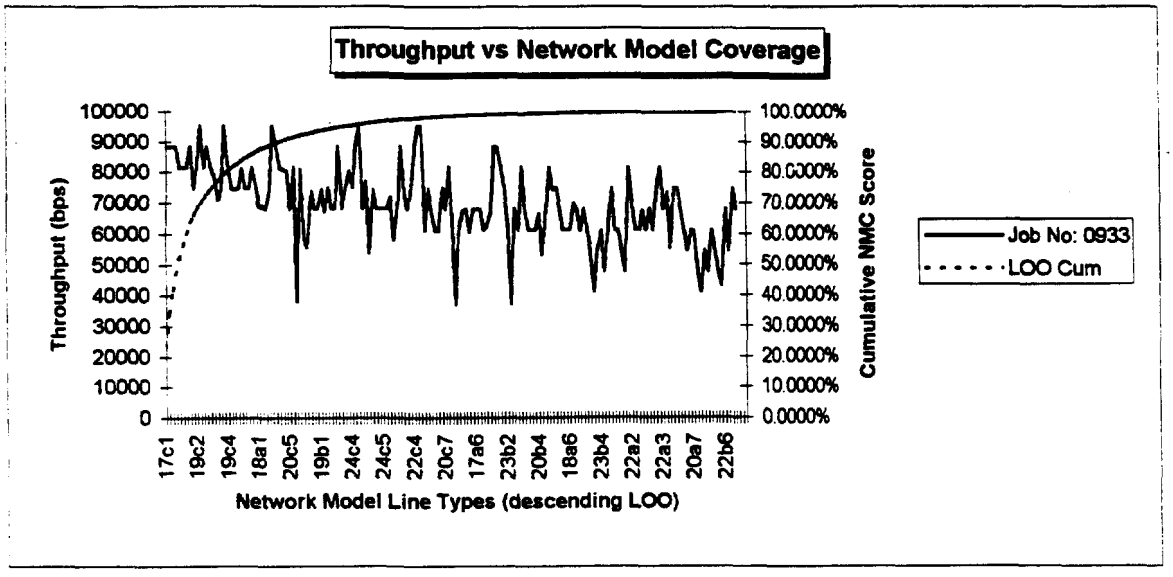
Line	Percent	Throughput			Line	Percent	Throughput
17c1	22.8620%	88,200			17a2	0.6440%	68,900
17c2	11.4310%	88,200			20c3	0.4700%	67,900
18c1	7.5440%	88,200			20c4	0.4700%	74,600
17c4	4.9700%	88,200			21c4	0.4300%	95,000
17c3	4.9700%	81,400			21c3	0.4300%	88,200
19c1	4.2780%	81,400			22c1	0.4140%	81,400
17c5	3.9760%	81,400			23c2	0.3910%	80,800
18c2	3.7720%	88,200			24c2	0.3910%	80,000
20c1	2.1620%	74,600			20c5	0.3760%	67,900
19c2	2.1390%	81,400			21c5	0.3440%	81,500
21c1	1.9780%	95,000			18a2	0.3220%	37,800
18c3	1.6400%	81,400			18b2	0.3220%	80,700
18c4	1.6400%	88,200			17b4	0.2800%	58,500
18c5	1.3120%	81,400			17a4	0.2800%	55,400
17b1	1.2880%	78,500			17b3	0.2800%	73,400
17a1	1.2880%	70,900			17a3	0.2800%	67,900
20c2	1.0810%	74,600			18c6	0.2624%	67,900
21c2	0.9890%	95,000			19b1	0.2300%	74,000
19c4	0.9300%	81,400			19a1	0.2300%	66,800
19c3	0.9300%	74,700			18c7	0.2296%	74,600
17c6	0.7952%	74,000			17b5	0.2240%	67,900
24c1	0.7820%	74,700			17a5	0.2240%	67,900
23c1	0.7820%	80,900			22c2	0.2070%	88,200
19c5	0.7440%	74,700			24c3	0.1700%	67,900
17c7	0.6958%	74,600			23c3	0.1700%	74,700
18b1	0.6440%	81,400			23c4	0.1700%	80,100
17b2	0.6440%	75,400			24c4	0.1700%	74,700
18a1	0.6440%	68,600			21a1	0.1610%	88,200

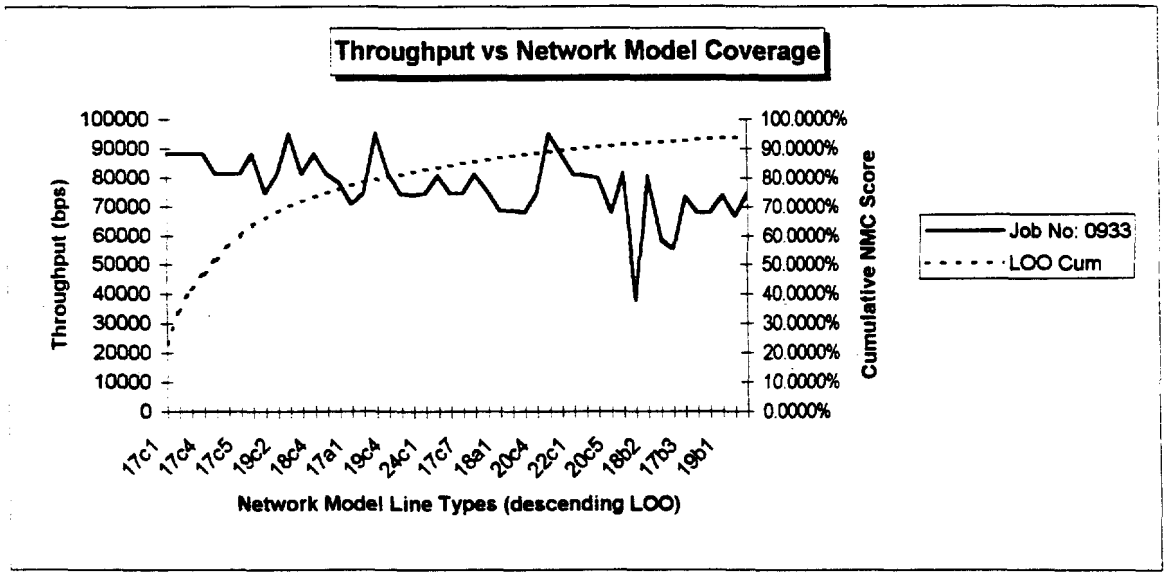
This page contains proprietary test results. Reproduction requires written permission from Henderson Labs





This page contains proprietary test results. Reproduction requires written permission from Henderson Labs.





HENDERSON LABORATORIES CORPORATION

Insight Test Standards for:
Hatfield Associates - Job #-0933

Appendix A

Test Conditions Covered:
TSB-37A (Lines 17-24)

COPYRIGHT © 1996 HENDERSON COMMUNICATIONS CORPORATION.
PHOTO REPRODUCTION FOR NONCOMMERCIAL USE IS PERMITTED WITHOUT PAYMENT OF ROYALTY PROVIDED THAT EACH REPRODUCTION IS DONE WITHOUT ALTERATION AND THAT THE JOURNAL REFERENCE AND COPYRIGHT NOTICE ARE INCLUDED ON THE FIRST PAGE.

TSB-37A (17-24): Impairment Combination Table

Impairments	Units	Line 17a	Line 17b	Line 17c	Line 18a	Line 18b	Line 18c
Network: (EO to EO) Parameters							
Connection Type - Score	%	55.3	55.3	55.3	19.2	19.2	19.2
Combination - Score	%	2.8	2.8	49.7	1.4	1.4	-16.4
1. Attenuation Distortion	EIA	None	None	None	None	None	None
2. Envelope Delay Distortion		None	None	None	None	None	None
3. 1 kHz Loss	dB	6.0	6.0	6.0	8.0	6.0	6.0
4. Noise							
4a. Background Noise	dBm	22	22	22	22	22	22
4b. Tone to Noise Ratio	dB	N/A	N/A	N/A	N/A	N/A	N/A
5. Phase Jitter							
5a. P-P deviation	Deg.	None	None	None	None	None	None
5b. Frequency	Hz	None	None	None	None	None	None
6. IMD- (4Tone)							
6a. 2nd Order (R2)	dB	40	43	50	43	50	55
6b. 3rd Order (R3)	dB	41	44	51	44	51	56
7. Frequency Offset							
7a. FO (A to B)	Hz	None	None	None	None	None	None
7b. FO (B to A)	Hz	None	None	None	None	None	None
8. PCM (64 kbit/s)							
8a. Tandem Links	No	1	1	1	1	1	1
8b. Robbed Bit Signaling		Yes	Yes	No	Yes	Yes	No
8c. Robbed Bit Signaling Location	Link No.	1	1		1	1	
9. ADPCM							
9a. Type		None	None	None	None	None	None
9b. Signaling rate	kbit/s	None	None	None	None	None	None
9c. ADPCM Location		None	None	None	None	None	None
10. Echo							
10a. Round Trip Delay	ms	80	80	80	80	80	80
10b. Trans Hybrid Loss (A)	dB	12	16	20	16	20	22
10c. Trans Hybrid Loss (B)	dB	12	16	20	16	20	22

COPYRIGHT © 1996 HENDERSON COMMUNICATIONS CORPORATION.

PHOTO REPRODUCTION FOR NONCOMMERCIAL USE IS PERMITTED WITHOUT PAYMENT OF ROYALTY PROVIDED THAT EACH REPRODUCTION IS DONE WITHOUT ALTERATION AND THAT THE JOURNAL REFERENCE AND COPYRIGHT NOTICE ARE INCLUDED ON THE FIRST PAGE.

TSB-37A (17-24): Impairment Combination Table

Impairments	Units	Line 19a	Line 19b	Line 19c	Line 20a	Line 20b	Line 20c
Network: (EO to EO) Parameters							
Connection Type - Score	%	10.3	10.3	10.3	5.2	5.2	5.2
Combination - Score	%	0.5	0.5	9.3	0.25	0.25	4.7
I. Attenuation Distortion		None	None	None	None	None	None
2. Envelope Delay Distortion		None	None	None	None	None	None
3. 1 kHz Loss	dB	8.0	6.0	6.0	8.0	6.0	6.0
4. Noise							
4a. Background Noise	dBrn	22	22	22	22	22	22
4b. Tone to Noise Ratio	dB	N/A	N/A	N/A	N/A	N/A	N/A
5. Phase Jitter							
5a. P-P deviation	Deg.	None	None	None	None	None	None
5b. Frequency	Hz	None	None	None	None	None	None
6. IMD- (4Tone)							
6a. 2nd Order (R2)	dB	40	43	50	40	43	50
6b. 3rd Order (R3)	dB	41	44	51	41	44	51
7. Frequency Offset							
7a. FO (A to B)	Hz	None	None	None	None	None	None
7b. FO (B to A)	Hz	None	None	None	None	None	None
8. PCM (64 kbit/s)							
8a. Tandem Links	No	2	2	2	3	3	3
8b. Robbed Bit Signaling		Yes	Yes	No	Yes	Yes	No
8c. Robbed Bit Signaling Location	Link No.	1	1		1	1	
9. ADPCM							
9a. Type		None	None	None	None	None	None
9b. Signaling rate	kbit/s	None	None	None	None	None	None
9c. ADPCM Location		None	None	None	None	None	None
10. Echo							
10a. Round Trip Delay	ms	80	80	80	80	80	80
10b. Trans Hybrid Loss (A)	dB	12	16	20	12	16	20
10c. Trans Hybrid Loss (B)	dB	12	16	20	12	16	20