IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

TV GUIDE ONLINE, INC. and TV GUIDE ONLINE, LLC, Plaintiffs and Counterclaim Defendants, v. TRIBUNE MEDIA SERVICES, INC., Defendant and Counterclaim Plaintiff.	)	C.A. No.: 05-725-*** **PUBLIC VERSION**

CONSOLIDATED APPENDIX OF EXHIBITS
FOR DEFENDANT TRIBUNE MEDIA SERVICES, INC.'S
OPENING SUMMARY JUDGMENT AND MARKMAN BRIEFING

VOLUME 2 OF 2

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Original Dated: October 5, 2007
Redacted Version: October 15, 2007

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search site GO



Bochco Is Back with 'Blind Justice' << at left

TODAY'S HEADLINES

- Everett Practices 'Boston Legal'
- FOX Makes 'Jonny Zero' Disappear
- Harry Potter 6' Cover Revealed
- Brother of Jackson's Accuser Caught in Lie
- 'Halloween' Writer-Producer Dies at 54
- 'Ray' Co-Star, 'L&O' Vet Land Pilots
- Popular 'Seabiscuit' Horse Dies

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1. Be Cool
2. The Pacifier
3. The Jacket
4. Man of the House
5. Diary of a Mad Black Woman

COMING SOON

- Mad Hot Ballroom
- Ice Princess
- Melinda and Melinda
- Milk and Honey
- The Ring Two

RECENT PHOTO GALLERIES

- Robots Premiere
- Oscar 2005: Backstage
- Oscars 2005: Red Carpet
- Be Cool Premiere
- Constantine Premiere

NIELSEN RATINGS

02/28/05 - 03/06/05

1. ABC PREMIERE EVENT-3/6(S) (ABC)
2. AMERICAN IDOL-TUESDAY (FOX)
3. CSI (CBS)
4. AMERICAN IDOL-WEDNESDAY (FOX)
5. AMERICAN IDOL SP-2/28 8P (S) (FOX)

BOOK SMART
VS.
STREET SMART

A 335
EG018471

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Special Section



American Idol -- Zap2it is back with its weekly recaps and dissections of the good, bad and just plain funny performances. [more]

TV Feature



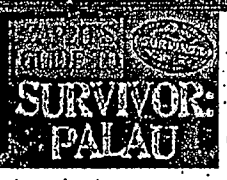
Confessions ... -- Jennifer Love Hewitt gets catty as Katya, a San Francisco ad whiz with a social agenda all her own. [more]

Photo Gallery



'Robots' Premiere -- Halle Berry, Ewan McGregor and Robin Williams lent their voices to the film and their presence to the red carpet. Check out the photos. [more]

Special Section



Survivor -- By the end of the first episode, 'Survivor: Palau' appears to be the same old game. Are there more surprises up its sleeve? [more]

Zap Fact:

Jodie Dallas, played by Billy Crystal on the '70s sitcom "Soap," was the first openly gay character on nationally broadcast television.

Want another factoid?
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REDACTED

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TMS 0001583

Report: Standard Metrics (Internet Applications Excluded)

Category: Entertainment: SubCategory: All

Adult Sites Excluded) - Brand or Channel Ranked: Month of April 2006 Panel Type: Home and Work Country: United States

Brand or Channel	Unique Audience (000)	Active Reach (%)	Universe Reach (%)	Rank	Web Page Views (000)	Web Rank	Visits Per Person	Web Pages Per Person	Time Per Person (hours:mi)
Entertainment	109850	75.56	53.41 n/a		29068305 n/a		18.72	265	2:16:00
Zuji.com	1969	1.36	0.96	95	28093	131	8.36	14	0:10:12

* Home and Work audience duplication projections did not meet minimum sample size standards. Combined home and work audience estimates for these sites may exhibit increased variability month-to-month as a result.
* A Client-specified custom aggregation of this site is available. Data visible in the Standard Metrics Trend and Audience Profile Reports.

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TMS 0001584

TMS 0001585

Adult Sites Excluded) - Home or Channel Portal: Month of May 2006 Panel Type: Home Country: United States

Unique Audience (000)

Name or Channel	Active Reach (%)	Universe Reach (%)	Rank	Web Page Views (000)	Web Rank	Visits Per Person	Web Pages Per Person	Time Per Person (hh:mm:ss)
Entertainment	84567	69.23	46.8 mb		1864368 kb			22:0 2:57:12
ZeeMovies	1413	1.16	0.7	97	1305	1.6	1.31	0 0:0:49

* Home and Work audience durations (minutes) AV and unknown sample also considered. Combined home and work audience estimates for these sites may exhibit increased variability month-to-month as a result.
- A (Zero) reported duration appropriate if any one or more Data visible in the Standard Metrics Panel was observed in the Panel.

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TMS 0001586

TMS 0001587

Report: Standard Metrics (Internet Applications Excluded
Category: Entertainment SubCategory: All

AAA Sites Excluded) - Brand or Channel Period: Month of May 2005 Panel Type: Work Country: United States

Brand or Channel

Entertainment

Unique Audience (000)

Brand or Channel	Active Reach (%)	Universe Reach (%)	Rank	Web Page Views (000)	Web Rank	Visits Per Person	Web Pages Per Person	Time Per Person (hh:mm:ss)
Entertainment	47606	84.22		78.85 n/a	12126170 n/a		16.23	334 2:26:14
ZapMt.com	988	1.74	78	1.83	21248	69	3.79	21 0:16:17

* Home and Work audience duplication projections for vast most minimum sample size standards. Combined home and work audience estimates for these sites may exhibit increased variability over panel or media. Sample size is the Standard Metrix Trend and Audience Profile Reports.
* A Client-specified custom segmentation of this site is available. Data visible in the Standard Metrix Trend and Audience Profile Reports.

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TMS 0001588

TMS 0001589

TMS 0001590

TMS 0001591

Report: Standard Metrix (Internet Applications Excluded
Category: Entertainment: Sub-Category: All

Adult Sites Excluded - Brand or Channel Persons of February 2005 Panel Type: Home Country: United States

Brand or Channel	Unique Audience (000)	Active Reach (%)	Universe Reach (%)	Rank	Web Pages Views (000)	Web Rank	Visits Per Person	Web Pages Per Person	Time Per Person (hh:mm:ss)
Entertainment									
ZapRt.com	91811	67.46	46.69 n/a		15581186 n/a		18.75	170	1:33:05
	1336	0.98	0.66	67	19774	148	1.23	6	0:07:11

^ Home and Work audience estimates are not meet minimum sample size standards. Combined home and work audience estimates for these sites may exhibit increased variability month-to-month as a result.
~ A Client-specified custom aggregation of this site is available. Data visible in the Standard Metrix Trend and Audience Profile Reports.

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TMS 0001592

TMS 0001593

Report: Standard Metrics (Internet Applications Excluded
Category: Entertainment SubCategory: All

Adult Sites Excluded - Brand or Channel Period: Month of February 2005 Panel Type: Work Country: United States

Brand or Channel	Unique Audience (000)	Active Reach (%)	Universe Reach (%)	Rank	Web Page Views (000)	Web Rank	Visits Per Person	Web Pages Per Person	Time Per Person (h:mm:ss)
Entertainment	46846	85.86	77.18 n/a		841625 n/a		14.27	206	2:12:47
Zip2Lose	806	1.54	1.33	74	8863	81	1.33	11	0:19:05

* Home and Work audience duplication projections did not meet minimum sample size standards. Combined home and work audience estimates for these sites may not be additive across the two panels as a result.
** A Client-specified custom application of the UVE is available. Data visible in the Standard Metrics Trend and Audience Profile Reports.

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TMS 0001594

TMS 0001595

TMS 0001596

TMS 0001597

TMS 0001598

TMS 0001599

Report: Standard Media (Internet Applications Ranked
Category: Entertainment SubCategory: All

Adult (Res Excluded) - Brand or Channel Period: Month of January 2006 Panel Type: Work Country: United States

Brand or Channel

Entertainment

Zap2It.com

* Home and Work audience duplication projections did not meet minimum sample size standards. Combined home and work audience estimates for these sites may exhibit increased variability month-to-month as a result.
** A Cross-Segment custom segmentation of this site is available. Data visible in the Standard Metrics Trend and Audience Profile Reports.

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	Unique Audience (000)	Active Reach (%)	Universe Reach (%)	Rank	Web Page Views (000)	Web Rank	Visits Per Person	Web Pages Per Person	Time Per Person (Minutes)
	6236	5.5	6.54	Nr	10791742	Nr	19.33	312	2:56:14
	1439	2.44	2.33	78	16488	84	1.69	12	0:07:45

TMS 0001600

TMS 0001601

TMS 0001602

Report: Standard Metrics (Internet Applications Excluded)
Category: Entertainment Sub-Category: All

Adult Sites (Excluded) - Brand or Channel Report: Month of February 2008 Panel Type: Home Country: United States

Brand or Channel	Unique Audience (000)	Active Reach (%)	Universe Reach (%)	Rank	Web Page Views (000)	Web Rank	Visits Per Person	Web Pages Per Person	Time Per Person (hh:mm:ss)
Entertainment	46668	81.55	20.33 n/a		1324644 n/a		18.26	287	2:46:16
ZapDrum	1300	2.28	2.1	79	17904	73	2.11	14	0:12:08

* Home and Work audience duplication projections did not meet minimum sample size standards. Combined home and work audience estimates for Panel who may exhibit increased variability month-to-month as a result.
* A Demographic custom aggregates of this site is available. Data visible in the Standard Metrics Trend and Audience Profile Reports.

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TMS 0001603

Report: Standard Metrics (Internet Applications Excluded, Adult Sites Excluded) - Brand or Channel Period: Month of July 2005 Panel Type: Home Country: United States

Category: Entertainment SubCategory: All

Brand or Channel	Unique Audience (000)	Active Reach (%)	Universe Reach (%)	Rank	Web Page Views (000)	Web Rank	Visits Per Person	Web Pages Per Person	Time Per Person (hh:mm:ss)
Entertainment,	98782,	70.59,	48.64,	n/a,	22210374,	n/a,	12.55,	225,	2:15:01
Zap2it.com,	1744,	1.25,	0.86,	102,	15038,	188,	1.86,	9,	0:05:50

^ Home and Work audience duplication projections did not meet minimum sample size standards. Combined home and work audience estimates for these sites may exhibit increased variability month-to-month as a result.
~ A Client-specified custom aggregation of this site is available. Data visible in the Standard Metrics Trend and Audience Profile Reports.

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Report: Standard Metrics (Internet Applications Excluded, Adult Sites Excluded) - Brand or Channel Period: Month of July 2005 Panel Type: Home and Work Country: United States

Category: Entertainment SubCategory: All

Brand or Channel	Unique Audience (000)	Active Reach (%)	Universe Reach (%)	Rank	Web Page Views (000)	Web Rank	Visits Per Person	Web Pages Per Person	Time Per Person (hh:mm:ss)
Entertainment,	114614,	76.31,	55.61,n/a,		35040519,n/a,	17.71,	306,		3:02:43
Zap2it.com,	2479,	1.65,	1.20,100,		27148,173,	2.72,	11,		0:10:13

^ Home and Work audience duplication projections did not meet minimum sample size standards. Combined home and work audience estimates for these sites may exhibit increased variability month-to-month as a result.
~ A Client-specified custom aggregation of this site is available. Data visible in the Standard Metrics Trend and Audience Profile Reports.

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Report: Standard Metrics (Internet Applications Excluded, Adult Sites Excluded) - Brand or Channel Period: Month of July 2005 Panel Type: Work Country: United States

Category: Entertainment SubCategory: All
Brand or Channel,Unique Audience (000),Active Reach (%),Universe Reach (%),Rank,Web Page Views (000),Web Rank,Visits Per Person,Web Pages Per Person,Time Per Person (hh:mm:ss)
Entertainment, 46574, 83.20, 76.15,n/a, 12830145,n/a, 16.86, 275, 2:43:18
Zap2it.com, 1008, 1.80, 1.65,94, 12109,102, 3.48, 12, 0:15:02

^ Home and Work audience duplication projections did not meet minimum sample size standards. Combined home and work audience estimates for these sites may exhibit increased variability month-to-month as a result.
~ A Client-specified custom aggregation of this site is available. Data visible in the Standard Metrics Trend and Audience Profile Reports.

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TMS 0001606

Report: Standard Metrics (Internet Applications Excluded, Adult Sites Excluded) - Brand or Channel Period: Month of August 2005 Panel Type: Home Country: United States

Category: Entertainment SubCategory: All
Brand or Channel,Unique Audience (000),Active Reach (%),Universe Reach (%),Rank,Web Page Views (000),Web Rank,Visits Per Person,Web Pages Per Person,Time Per Person (hh:mm:ss)
Entertainment, 100195, 71.27, 49.29,n/a, 22840295,n/a, 12.86, 228, 2:20:40
Zap2it.com, 1810, 1.29, 0.89,83, 15271,158, 2.09, 8, 0:05:25

^ Home and Work audience duplication projections did not meet minimum sample size standards. Combined home and work audience estimates for these sites may exhibit increased variability month-to-month as a result.
- A Client-specified custom aggregation of this site is available. Data visible in the Standard Metrics Trend and Audience Profile Reports.

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TMS 0001607

Report: Standard Metrics (Internet Applications Excluded, Adult Sites Excluded) - Brand or Channel Period: Month of August 2005 Panel Type: Home and Work Country: United States

Category: Entertainment SubCategory: All

Brand or Channel,Unique Audience (000),Active Reach (%),Universe Reach (%),Rank,Web Page Views (000),Web Rank,Visits Per Person,Web Pages Per Person,Time Per Person (hh:mm:ss)

Entertainment, 116207, 77.15, 56.26,n/a, 37474662,n/a, 19.18, 322, 3:15:10

Zap2it.com, 2787, 1.85, 1.35,80, 36927,123, 3.05, 13, 0:08:21

^ Home and Work audience duplication projections did not meet minimum sample size standards. Combined home and work audience estimates for these sites may exhibit increased variability month-to-month as a result.

~ A Client-specified custom aggregation of this site is available. Data visible in the Standard Metrics Trend and Audience Profile Reports.

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TMS 0001608

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Report: Standard Metrics (Internet Applications Excluded, Adult Sites Excluded) - Brand or Channel Period: Month of August 2005 Panel Type: Work Country: United States

Category: Entertainment SubCategory: All
Brand or Channel,Unique Audience (000),Active Reach (%),Universe Reach (%),Rank,Web Page Views (000),Web Rank,Visits Per Person,Web Pages Per Person,Time Per Person (hh:mm:ss)
Entertainment, 48805, 86.16, 81.10,n/a, 1463437,n/a, 19.26, 300, 2:55:55
Zap2it.com, 1364, 2.41, 2.27,71, 21656,68, 3.46, 16, 0:09:53

^ Home and Work audience duplication projections did not meet minimum sample size standards. Combined home and work audience estimates for these sites may exhibit increased variability month-to-month as a result.
– A Client-specified custom aggregation of this site is available. Data visible in the Standard Metrics Trend and Audience Profile Reports.

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TMS 0001609

Report: Standard Metrics (Internet Applications Excluded
Category: Entertainment Sub-Category: All

Adult Sites Excluded) - Brand or Channel Persons 2006 Panel Type: Home Country: United States

Brand or Channel	Unique Audience (000)	Active Reach (%)	Universe Reach (%)	Rank	Web Page Views (000)	Web Rank	Visits Per Person	Web Pages Per Person	Time Per Person (hh:mm:ss)
Entertainment	95604	71.23	45.58 mb		25613482 mb		13.62	229	2:16:25
Zap2it.com	1446	1.06	0.73	89	13422	145	2.09	9	0:05:03

* Home and Work audience duplication projections did not meet minimum sample size standards. Combined Home and work audience estimates for these sites may exhibit increased variability month-to-month as a result.
- = A Client-specified custom aggregation of this site is available. Data visible in the Standard Metrics Trend and Audience Profile Reports.

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TMS 0001610

Report: Standard Metrix [Internet Applications Excluded
Category: Entertainment Sub-Category: All

Adult Sites Excluded) - Brand or Channel Portal: Month of September 2003 Panel Type: Home and Work Country: United States

Brand or Channel	Unique Audience (000)	Active Reach (%)	Universe Reach (%)	Rank	Web Page Views (000)	Web Rank	Visits Per Person	Web Pages Per Person	Time P Person (hh:mr
Entertainment			65.82 mb		27071362 mb		18.46	321	3:05
Zap2It.com	155075	77.74							
	2275	1.8	1.15	90	26072	147	2.41	11	0:02

* Home and Work audience duplication projections did not meet minimum sample size standards. Combined home and work audience estimates for these sites may exhibit increased variability month-to-month as a result.
* A Cross-Property custom aggregation of this site is available. Data will be in the Standard Metrix Trend and Audience Profile Reports.

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TMS 0001611

TMS 0001612

TMS 0001613

TMS 0001614

Report: Standard Metrics (Internet Applications Excluded)
Category: Entertainment SubCategory: All

Adult Sites Excluded) - Brand or Channel Persons Month of October 2006 Panel Type: Work Country: United States

Brand or Channel	Unique Audience (000)	Active Reach (%)	Universe Reach (%)	Rank	Web Page Views (000)	Web Rank	Visits Per Person	Web Pages Per Person	Time Per Person (hh:mm:ss)
Entertainment	4628	17.4	53.13 est		14078622 est		16.87	282	2:41:45
ZoneLabs.com	1165	2.55	1.53	80	13741	85	2.41	12	0:10:29

* Home and Work audience duplication projections did not meet minimum sample size standards. Combined home and work audience estimates for these sites may exhibit increased variability month-to-month as a result.
** A Claim-panelled custom aggregation of the site is available. Data visible in the Standard Metrics Trend and Audience Profile Reports.

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TMS 0001615

TMS 0001616

TMS 0001617

Report: Standard Metrix (Internet Applications Enabled)

Adult Sites Enabled) - Brand or Channel Period: Month of November 2005 Panel Type: Work Country: United States

Category: Entertainment SubCategory: All

Unique Audience (000)

Brand or Channel	Active Reach (%)	Universe Reach (%)	Rank	Web Page Views (000)	Web Rank	Visits Per Person	Web Pages Per Person	Time Per Person (hh:mm:ss)
Entertainment	49623	84.65	81.4 mln	1479463 mln		18.77	288	2:54:37
Zap2it.com	1533	2.66	2.51 84	21613	70	2.37	14	0:37:54

* Home and Work audience qualification projections did not meet minimum sample size standards. Combined home and work audience estimates for this site may exhibit increased reliability. Please refer to the Standard Methodology Guide for more information.
- A Client-specified custom aggregation of this site is available. Data visible in the Standard Metrix Trend and Audience Profile Reports.

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TMS 0001618

Report Standard Metrics (Internet Applications Extended)

Adult Sites Excluded) - Brand or Channel Period: Month of December 2006 Panel Type: Work Country: United States

Category: Entertainment SubCategory: All

Brand or Channel	Unique Audience (000)	Active Reach (%)	Universe Reach (%)	Rank	Web Page Views (000)	Web Rank	Visits Per Person	Web Pages Per Person	Time Per Person (hh:mm:ss)
Entertainment									
ZeaSt.com	4828	17.25	81.61 Hi		13920466 Hi		16.04	270	24:24
	1419	2.49	2.23	72	16825	66	2.85	11	0:10:33

• Home and Work audience duplication projections did not meet minimum sample size standards. Combined home and work audience estimates for these sites may exhibit increased variability month-to-month as a result.
– A Cross-specified custom aggregation of this site is available. Data visible in the Standard Metrics Trend and Audience Profile Reports.

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TMS 0001619

Report Standard Metrics (Internet Applications Excluded
Adult Sites Excluded) - Brand or Channel Period: Month of December 2005

Category: Entertainment SubCategory: All
Brand or Channel

	Unique Audience (000)	Active Reach (%)	Universe Reach (%)	Rank	Web Page Views (000)	Web Rank	Visits Per Person	Web
Entertainment	119284	78.39	57.67 n/a		38032358 n/a		18.69	318 2:11:06
Zap2it.com	3004	1.97	1.45 84		28304	150	2.12	10 0:08:54

* Home and Work audience duplication projections did not meet minimum sample size standards. Combined home and work audience estima
- A Client-specified custom segregation of this site is available. Data visible in the Standard Metrics Trend and Audience Profile

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TMS 0001620

Report: Standard Metrics (Internet Applications Excluded)

Category: Entertainment: Sex/Dating (cr: All

Adult Sites Excluded) - Brand or Channel Persons: Month of December 2006 Panel Type: Home Country: United States

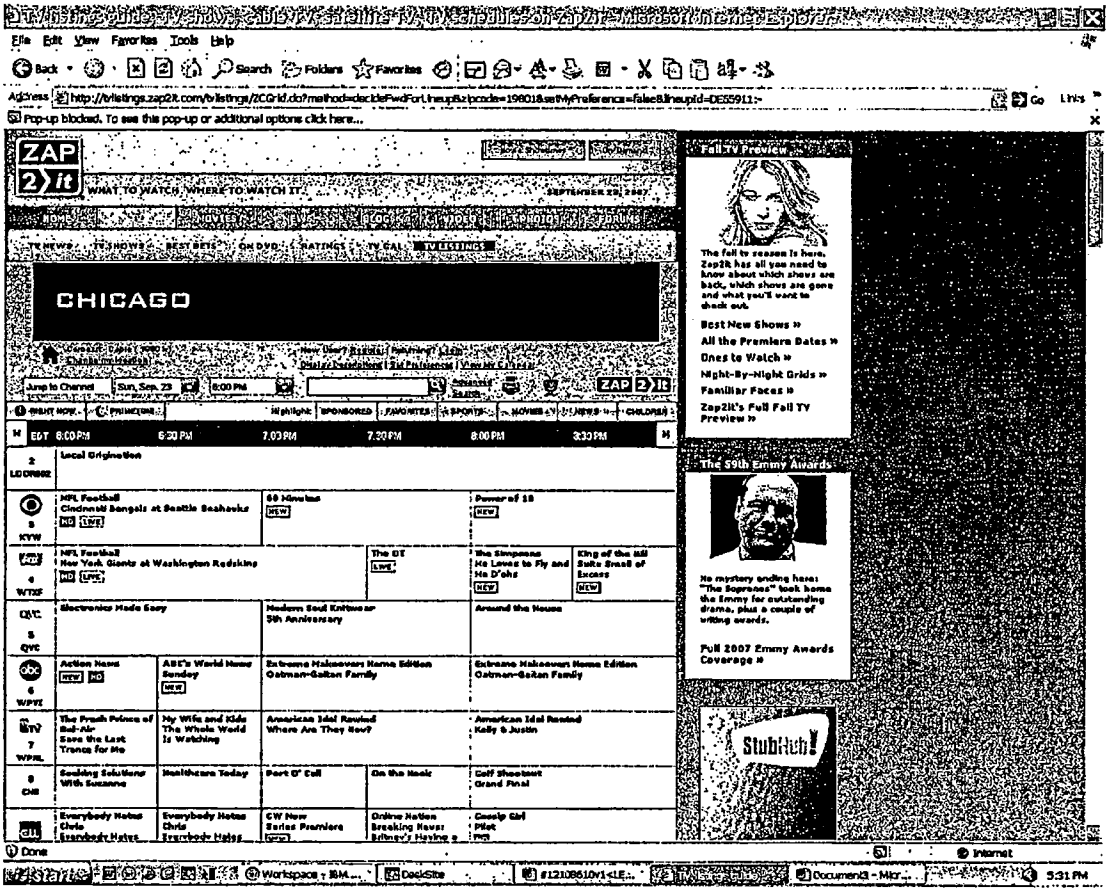
Brand or Channel	Unique Audience (000)	Active Reach (%)	Universe Reach (%)	Rank	Web Page Views (000)	Web Rank	Visits Per Person	Web Pages Per Person	Time Per Person (hh:mm:ss)
Entertainment		194169	72.46		61.12 mil	24111689 mil	12.76	231	2:1:53
Zap2it.com		1866	1.26		8.68 87	14019	196	1.82	6 0:06:48

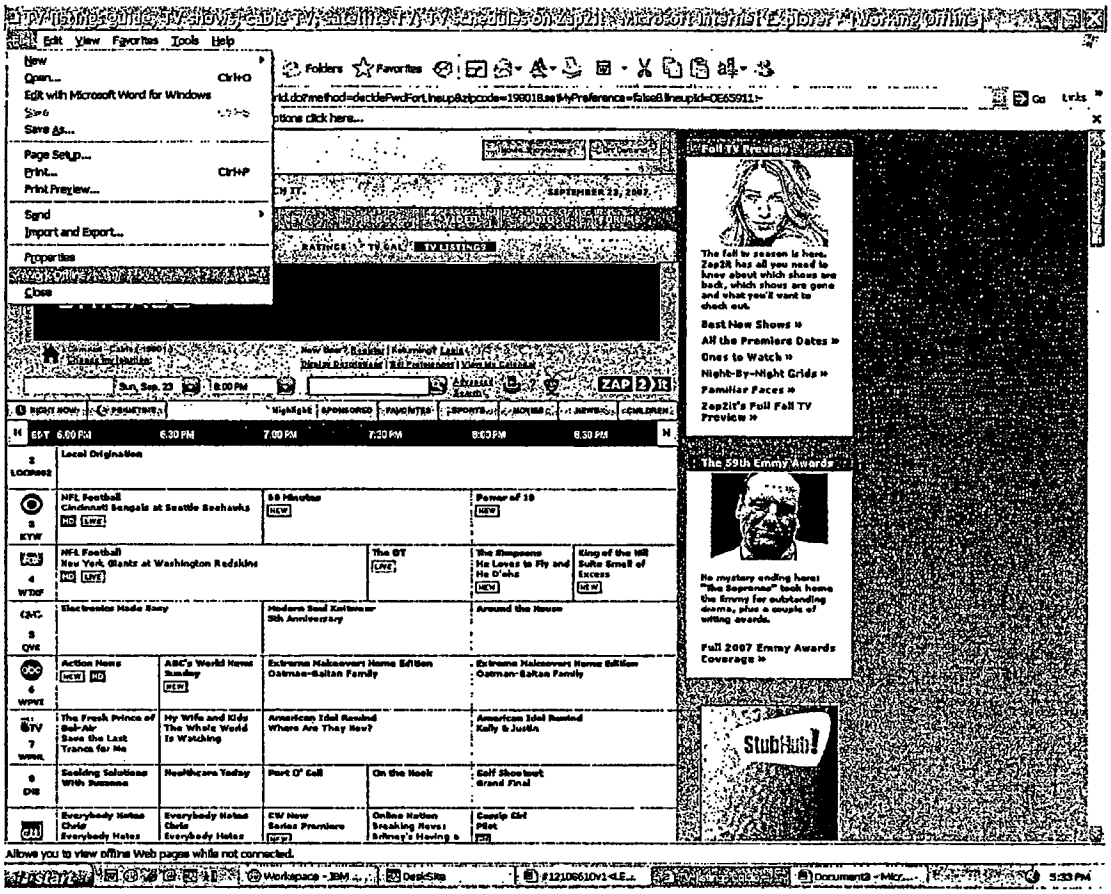
* Home and Work audience duplication projections did not meet minimum sample size standards. Combined home and work audience estimates for these sites may exhibit increased variability month-to-month as a result.
~ A Client-specified custom aggregate of the site is available. Data visible in the Standard Metrics Trend and Audience Profile Reports.

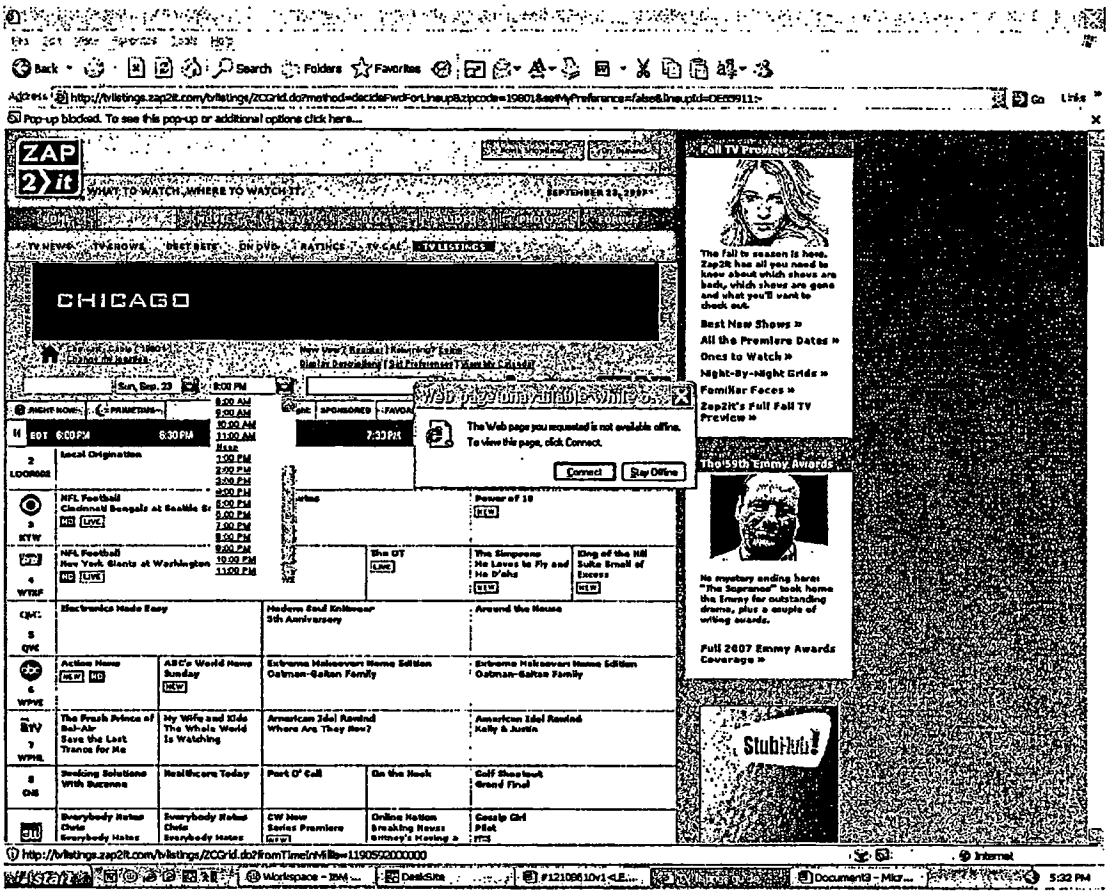
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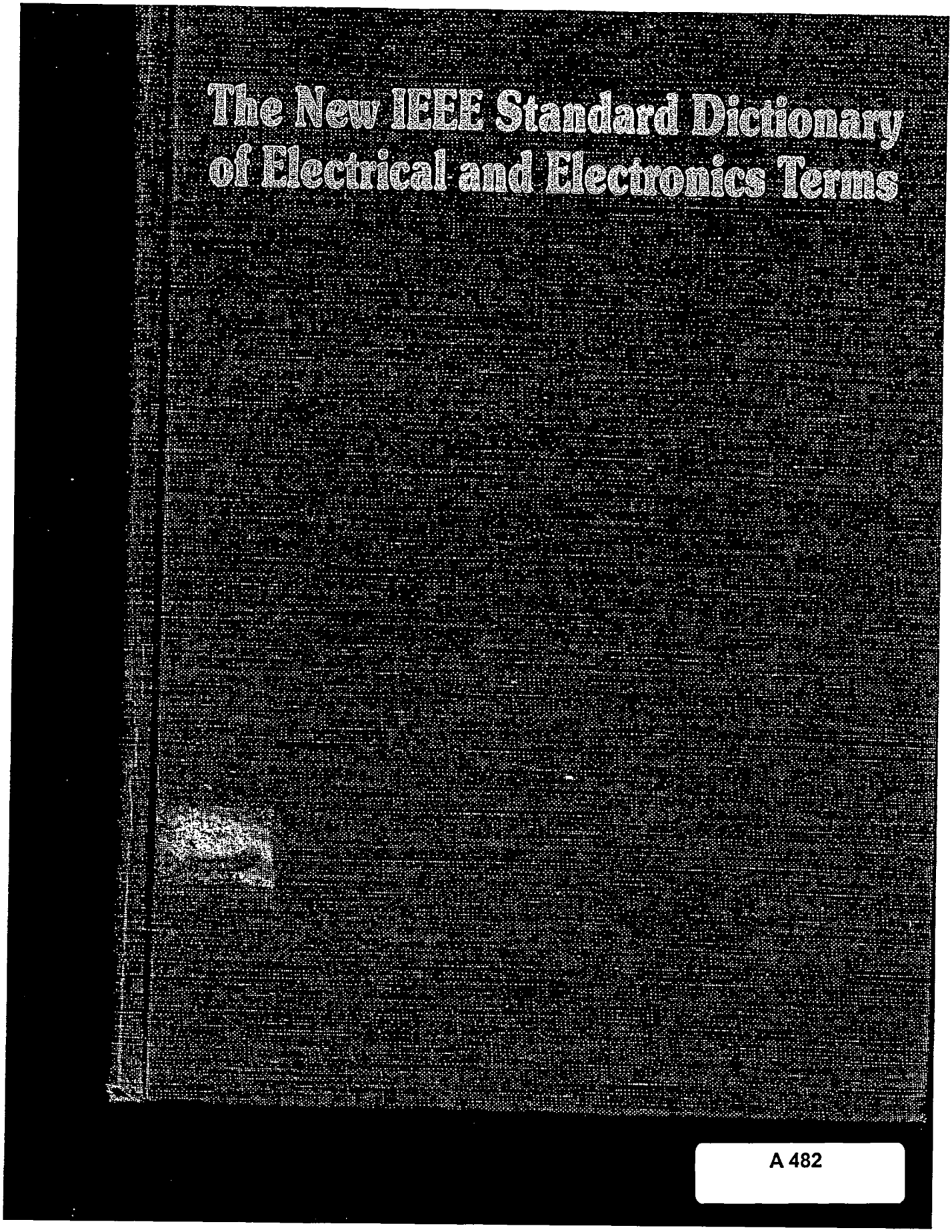
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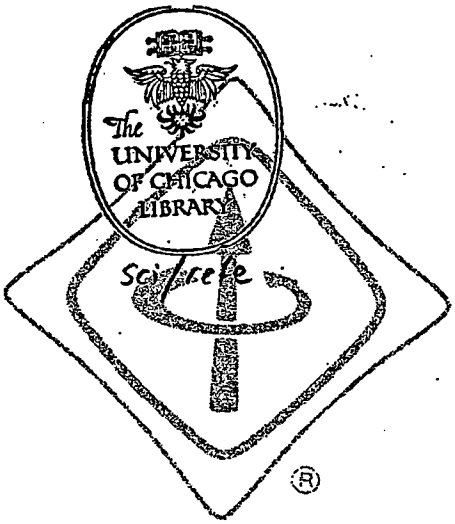

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The New IEEE Standard Dictionary
of Electrical and Electronics Terms
A 482



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download. (A) To transfer some collection of data from a computer memory to another storage location. (B) To transfer some collection of data from the memory of one computer to the memory of a second computer that is relatively smaller than the first; for example, to transfer data from a mainframe computer to a microcomputer. 610.5-1990

downstream. The direction of data flow along a bus; i.e., away from the head of bus function. 802.6-1990

down time (1) (station control and data acquisition). The time during which a device or system is not capable of meeting performance requirements. C37.1-1979

(2) (supervisory control, data acquisition, and automatic control). The time during which a device or system is not capable of meeting performance requirements. C37.1-1987

down time (1) (software). The period of time during which a system or component is not operational or has been taken out of service. *Contrast with:* **up time.** *See also:* **busy time; idle time; mean time to repair; set-up time.** 610.12-1990

(2) (broadband local area networks). The time interval during which a network is not available for access by the user. 802.7-1989

downward compatible. Pertaining to hardware or software that is compatible with an earlier or less complex version of itself; for example, a program that handles files created by an earlier version of itself. *Contrast with:* **upward compatible.** 610.12-1990

downward component (illuminating engineering). That portion of the luminous flux from a luminaire that is emitted at angles below the horizontal.

downward compression. In software design, a form of demodularization in which a superordinate module is copied into the body of a subordinate module. *Contrast with:* **lateral compression; upward compression.** 610.12-1990

downward modulation. Modulation in which the instaneous amplitude of the modulated wave is never greater than the amplitude of the unmodulated carrier. 188-1952w

DP (1). Dial pulse. 973-1990

(2). Acronym for **data processing.** 610.2-1987

DQDB layer. The sublayer in this standard that uses the services of the physical layer to provide the following: (A) Medium access control (MAC) sublayer service to the logical link control (LLC) sublayer, (B) isochronous service, and (C) connection-oriented data service. 802.6-1990

DR. *See:* **dead reckoning.**

draft gauge (navigation aid terms). A hydrostatic instrument installed in vessels to indicate the depth to which a vessel is submerged. 172-1983

drag-in (electroplating). The quantity of solution that adheres to cathodes when they are introduced into a bath. *See:* **electroplating.** [119]

dragging. The process of moving a selected display element on a display surface from one position to another with a locator. 610.6-1991

drag magnet. *See:* **retarding magnet.**

drag-out (electroplating). The quantity of solution that adheres to cathodes when they are removed from a bath. *See:* **electroplating.** [119]

drain (1) (general). The current supplied by a cell or battery when in service. *See:* **battery (primary or secondary).** [119]

(2) (metal-nitride-oxide field-effect transistor). Region in the device structure of an insulated-gate field-effect transistor (IGFET) which contains the terminal into which charge carriers flow from the source through the channel. It has the potential which is more attractive than the source for the carriers in the channel. 581-1978w

drainage (corrosion). Conduction of current (positive electricity) from an underground metallic structure by means of a metallic conductor. [59]

drainage unit (wire-line communication facilities). Center-tapped inductive device designed to relieve conductor-to-conductor and conductor-to-ground voltage stress by draining extraneous currents to ground. It is also designed to serve the purpose of a mutual drainage reactor forcing simultaneous protector-gap operation. 487-1980

drain line (rotating machinery) (bearing oil system). A return pipe line using gravity flow. *See:* **oil cup (rotating machinery).** [9]

drawbar pull (cable plowing). The effective pulling force delivered. 590-1977

drawbridge coupler. *See:* **movable-bridge coupler.**

drawdown (power operations). The distance that the water surface of a reservoir is lowered from a given elevation as the result of the withdrawal of water. 858-1987

drawout circuit breaker. Circuit breaker equipped with slides or rollers and quick disconnect means to facilitate removal and replacement. 1020-1988

drawout-mounted device (power switchgear). One having disconnecting devices and in which the removable portion may be removed from the stationary portion without the necessity of unbolting connections or mounting supports. *See:* **stationary-mounted device.** C37.100-1981

imation, representation, or idealization of selected aspects of the structure, behavior, operation, or other characteristics of a real-world process, concept, or system. *Note:* Models may have other models as components. (B) To serve as a model as in (A). (C) To develop or use a model as in (A). 610.3-1989

(4) (computer graphics). An accurate and complete graphical representation of an object. *See also:* **modeling system.** 610.6-1991

modeling. Technique of system analysis and design using mathematical or physical idealizations of all or a portion of the system. Completeness and reality of the model are dependent on the questions to be answered, the state of knowledge of the system, and its environment. *See:* **system.** [63]

modeling system. A system in which a computer graphics model can be defined or transformed using world coordinates. 610.6-1991

model space. The coordinate system used by a computer graphics model. 610.6-1991

model validation. The process of determining the degree to which the requirements, design, or implementation of a model are a realization of selected aspects of the system being modeled. *See also:* **fidelity.** *Contrast with:* **model verification.** 610.3-1989

model verification. The process of determining the degree of similarity between the realization steps of a model; for example, between the requirements and the design, or between the design and its implementation. *Contrast with:* **model validation.** 610.3-1989

modem (1) (data transmission). A contraction of MOdulator-DEModulator, an equipment that connects data terminal equipment to a communication line. 599-1985w

(2) (supervisory control, data acquisition, and automatic control). A MOdulator/DEModulator device which converts serial binary digital data to and from the signal form appropriate for the respective communication channel. C37.1-1987

(3) (broadband local area networks). A modulator-demodulator device. The modulator encodes digital information onto an analog carrier signal by varying the amplitude, frequency, or phase of that carrier. The demodulator extracts digital information from a similarly modified carrier. A modem transforms digital signals into a form suitable for transmission over an analog medium. 802.7-1989

mode mixer. *See:* **mode scrambler.** 812-1984

mode of operation (rectifier circuit). The characteristic pattern of operation determined by the sequence and duration of commutation and conduction. *Note:* Most thyristor converters and rectifier circuits have several modes of operation, which may be identified by the shape of the current wave. The particular mode obtained at a given load depends upon the circuit constants. *See:* **rectification; rectifier circuit element.** 444-1973

mode of propagation (waveguides). A form of propagation of guided waves that is characterized by a particular field pattern in a plane transverse to the direction of propagation, which field pattern is independent of position along the axis of the waveguide. *Note:* In the case of uniconductor waveguides the field pattern of a particular mode of propagation is also independent of frequency. *See:* **waveguide.** 146-1980w, 148-1959w

mode of propagation, ionospheric. Representation of a transmission path by the number of hops between the end points of the path, the ionospheric layers producing the ionospheric reflections being indicated for each hop. Example: 1F + 1E represents a hop with an ionospheric reflection in the F region followed by a reflection at the ground, followed, in turn, by a hop with a reflection from the E region. 211-1990

mode of propagation. A form of electromagnetic wave than can advance and can transport energy along the axis of a transmission line without change in the form of the electromagnetic field pattern in successive transverse sections (except for a monotonic decrease in amplitude along the direction of propagation, due to energy dissipation, which is present to some degree in every transmission line). 1004-1987

mode of resonance (waveguide). A form of natural electromagnetic oscillation in a resonator, characterized by a particular field pattern. 146-1980w

mode of vibration (vibratory body, such as a piezoelectric crystal unit). A pattern of motion of the individual particles due to (1) stresses applied to the body; (2) its properties; and (3) the boundary conditions. Three common modes of vibration are (A) flexural, (B) extensional, and (C) shear. *See:* **crystal.** [119]

mode scrambler (fiber optics). (A) A device for inducing mode coupling in an optical fiber. (B) A device composed of one or more optical fibers in which strong mode coupling occurs. *Note:* Frequently used to provide a mode distribution that is independent of source characteristics or that meets other specifications. *Syn:* **mode mixer.** *See:* **mode coupling.** 812-1984

mode shape. A plot of the displacements of various points in which the vibrating structure at a particular instant in time. *Note:* With each natural frequency of a vibrating structure there is associated a characteristic mode shape. C37.122-1983

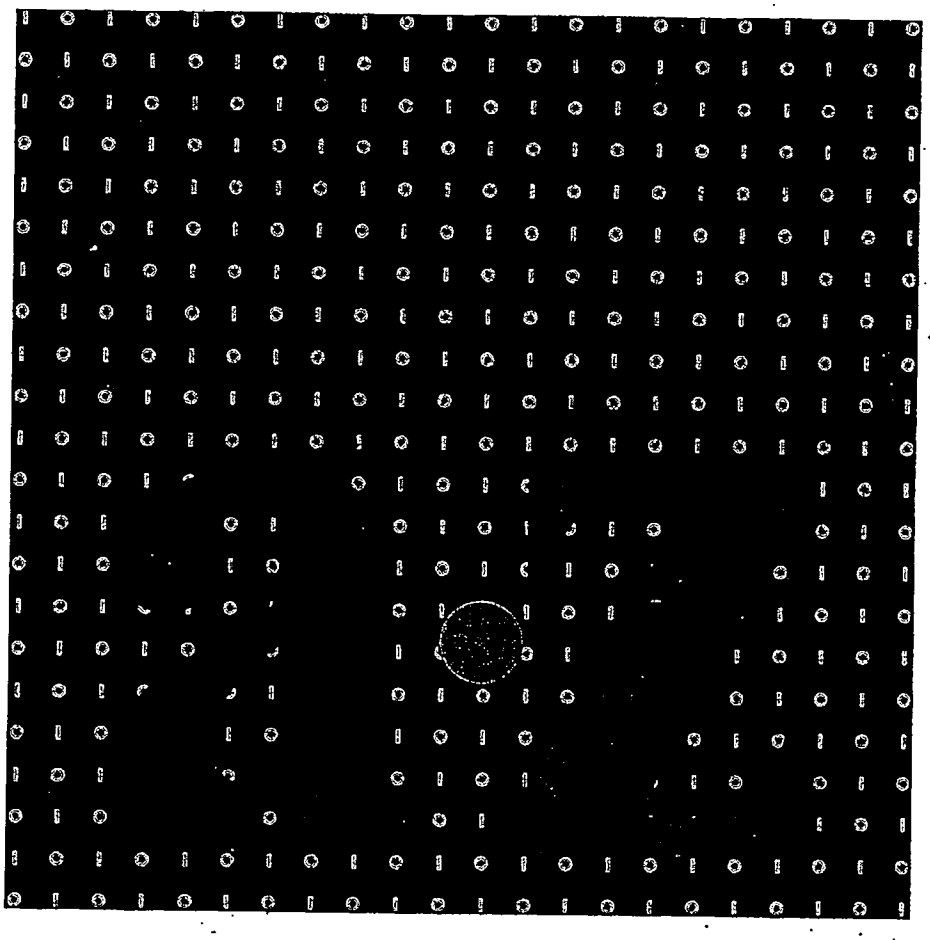
mode stripper. *See:* **cladding mode stripper.**

mode transducer (waveguide components). A device for transforming an electromagnetic

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SC20-1699-8

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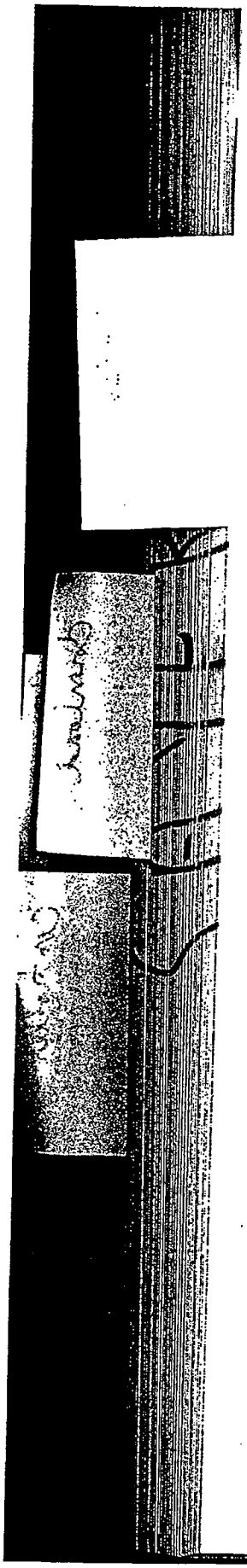
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mode-level field. In a System/36 program, a field that has its value saved and is then cleared when the operating mode changes. Contrast with job-level field, session-level field.

modeling. In RACF, the ability of a user or an installation to define a sample "model" profile that RACF uses when defining a new profile.

Note: Each profile model can contain defaults for fields such as the universal access authority, level, owner, auditing flags, access list, erase indicator, security classification information, and installation-defined data.

modeling coordinates. In AIX* graphics, the coordinate system in which all drawing primitives do their drawing. The user can select the position and orientation of the modeling space with regard to the world space by means of translations, rotations, scales, or generalized transformations. See also eye coordinates, primitive coordinates, screen coordinates, transformation, world coordinates.

modeling transformation. In AIX* graphics, transformation that maps modeling coordinates into world coordinates, in which all drawing primitives specify positions that are presumed to be positions in modeling coordinates. Modeling transformation can be used to move the object being drawn.

Model 65 Multiprocessing System (M65MP). A computing system in which two connected 2065 processing units share the same main storage and most I/O devices. The activities of the two processing units are directed by a single control program.

model statement. A statement in the body of a macrodefinition or in open code from which an assembler language statement can be generated at preassembly time. Values can be substituted at one or more points in a model statement; one or more identical or different statements can be generated from the same model statement under control of a conditional assembly loop.

model-unique licensed internal code. The licensed internal code, shipped with system hardware, that provides support for that model. See also licensed internal code.

modem (modulator/demodulator). (1) A functional unit that modulates and demodulates signals. One of the functions of a modem is to enable digital data to be transmitted over analog transmission facilities. (T) (A) (2) A device that converts digital data from a computer to an analog signal that can be transmitted on a telecommunication line, and converts the analog signal received to data for the computer. (3) See also communication line adapter, modulation.

modem eliminator. A device that connects a workstation directly to a computer port through a wired connector with a specific pin arrangement. When two devices both function as data terminal equipment (DTE), the cable that connects them must transmit send and receive signals using a modem eliminator. Synonymous with null modem.

mode name. In ACF/TCAM, the name of an entry in the logon mode table.

mode-name entry. The entry in an LU-mode tains information about the mode associated w logical unit.

mode table. Synonym for bind image table.

mode word. In the AIX* file system, an i-n describes the type and state of the i-node.

mode-2 character. In GDDM, a graphics symbol), characterized by an unchanging siz from picture elements. Contrast with mod See also hardware character.

mode-3 character. In GDDM, a graphics symbol), characterized by a variable size an structed from lines and curves. Contrast with acter. See also hardware character.

modification. (1) An addition or change to st deletion of stored data. (A) (2) In a conce language, the replacement of a sentence in t base or conceptual schema by another one, t changing the collection of sentence deducible. (A) (3) The change or custor system, subsystem, or application to work m at a given installation. (4) In SMP/E, an alte rection to a system control program, license user program. Synonymous with system (SYSMOD).

modification command. In a data manipulat one of a set of statements that allows a program or a database administrator to inser delete information stored in a database. (A)

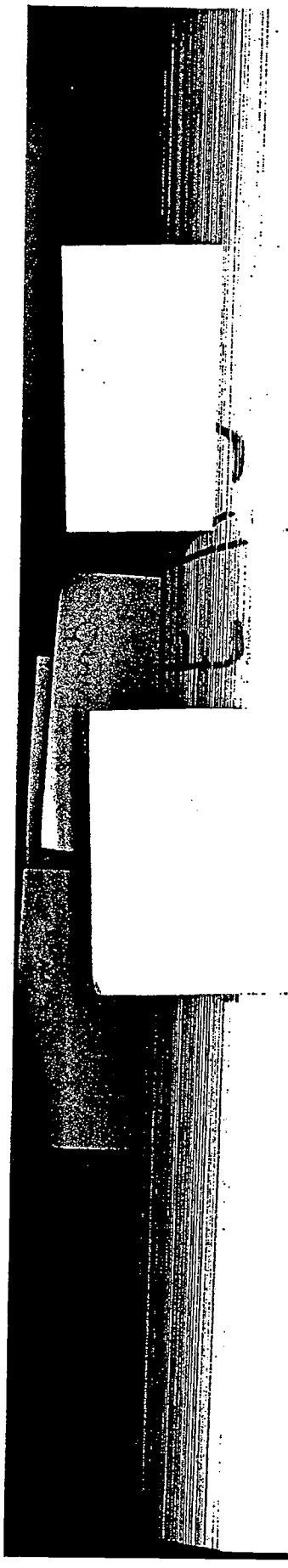
modification detection code (MDC). In cr number or value that interrelates all bits of a c that when enciphered, the modification of any stream results in a new MDC.

modification level. A distribution of all te issued since the previous modification level. modification level does not add new functions programming support category of the releas applies. See also release, version.

Note: Whenever a new release of a program l modification level is set to 0. When the releas with the accumulated service changes incc modification level is incremented by 1.

modified data tag (MDT). (1) In the AS/400* s cator, associated with each input or output/i displayed record, that is set ON when data are field. The modified data tag is maintained l device and can be used by the program using 3270, a bit in each input field that, when set, ca to be transferred to the host system.

modified frequency modulation (MFM). Th varying the amplitude and frequency of a writ pertains to the number of bytes of storage that on the recording media. The number of byte



real-time operation. (1) In analog computing, operation in the computer mode, during which the time scale factor is one. (I) (A) (2) Synonym for real-time processing.

real-time output. Output data delivered from a data processing system within time limits that are determined by the requirements of some other system or at instants that are so determined. (I) (A)

real-time processing. The manipulation of data that are required or generated by some process while the process is in operation; usually the results are used to influence the process, and perhaps related processes, while it is occurring. (I) (A) Synonymous with real-time operation.

real-time simulation. The operation of a simulator so that the time scale factor is equal to one for a physical time specified by the system being simulated and by the corresponding computer time of the simulator. (A)

rear compression. In VSAM, the elimination from a key of characters to the right of the first character that is unequal to the corresponding character in the following key.

reasonableness check. A check to determine whether a value conforms to specified criteria. (T)

reassign. To mark a disk sector as damaged. The marked disk sector points to another sector location where the data from the damaged sector is moved.

reboot. Synonym for system reset.

rebound distance. On a typewriter, the distance between the face of the type element and the platen when the type element has engaged its stop. This distance influences the force of impression and depends on the thickness of the paper. (T)

rebuild maintenance. A method of maintaining keyed access paths for database files. This method updates the access path only while the file is open. After the file is closed and reopened, the access path is rebuilt. Contrast with delay maintenance, immediate maintenance.

recall. (1) In ACF/TCAM, a method of retrieving a message or a part of a message in order to process or redirect it. (2) In the Data Facility Hierarchical Storage Manager, the process of moving a migrated data set from a level 1 or level 2 volume to a primary volume.

receive. (1) To obtain and store data. (2) In systems with ACF/TCAM, to obtain a message transmitted from a terminal to the computer over a line. Contrast with send. See also accept, enter.

received line signal detector (RLSD). A signal defined in the EIA-232 standard that indicates to the data terminal equipment (DTE) that it is receiving a signal from the remote data circuit-terminating equipment (DCE).

receive interruption. The interruption of a transmission to a terminal by a higher priority transmission from the terminal. Synonymous with break.

receive leg. The side of a duplex line Contrast with transmit leg.

receive mode. In the AS/400* system and during which the BSC adapter looks for syn acters, and stores the data characters in m

receive not ready packet. See RNR packet

receive not ready (RNR). In communica command or response that indicates a te of being unable to accept incoming frames

receive-only typing reperforator. A telety producing perforated tape with characte edge. Synonymous with rotor.

receive pacing. In SNA, the pacing of me received by a component. See also send p

receiver. (1) A person or thing that rec See also addressee. Contrast with sende receiver.

receiver directory. In the AS/400* system, s tion about the journal receivers that are or the specified journal and are still known to

receive ready (RR). In communicatio command or response that indicates that to receive protocol data units. Receive re edges receipt of protocol data units.

receive ready packet. See RR packet.

receiver-transmitter. See universal receiv

receive state. A state in which a transac receive but not send data. Contrast with se

receive time-out. In data communication, no data has been received in a specific peri

receiving. In ACF/TCAM, the process by processor obtains a message entered at a with sending.

receiving-end crossfire. The crossfire channel introduced from one or more adja the terminal end remote from the transmitte

receiving margin. In telegraph applicati range over which a range finder may be normal range for a properly adjusted mac mately 75 points on a 120-point scale. S operating range. See also range finder.

receiving perforator. A punch that converts pulse patterns into hole patterns or cu tape. (A) Synonymous with tape punch.

receiving service user. In Open Systems architecture, a service user that acts as a the data transfer phase of a connection. (T)

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-geny *n comb form* [Gk *-geneia* act of being born, fr. *-genēs* born — more at -GEN] : generation : production ⟨phylogeny⟩

geo- *comb form* [L, fr. Gk *geō-*, fr. *gē*] 1 : earth : ground : soil ⟨geophyte⟩ 2 : geographic : geography and ⟨geopolitics⟩

geo-bot-a-ny \ˌjē-ō-ˈbä-tə-nē, -ˈbät-nē\ *n* (1904) : PHYTOGEOGRAPHY — **geo-bo-tan-i-cal** \-bə-ˈta-ni-kəl\ *also* **geo-bo-tan-ic** \-nik\ *adj* — **geo-bot-a-nist** \-ˈbä-tə-nist, -ˈbät-nist\ *n*

geo-cen-tric \ˌjē-ō-ˈsen-trik\ *adj* (1686) 1 a : relating to, measured from, or as if observed from the earth's center — compare TOPOCENTRIC b : having or relating to the earth as center — compare HELIOCENTRIC 2 : taking or based on the earth as the center of perspective and valuation — **geo-cen-tri-cal-ly** \-tri-k(ə-)lē\ *adv*

geo-chem-is-try \ˌjē-ō-ˈke-mə-strē\ *n* (1902) 1 : a science that deals with the chemical composition of and chemical changes in the solid matter of the earth or a celestial body (as the moon) 2 : the related chemical and geological properties of a substance — **geo-chem-i-cal** \-ki-kəl\ *adj* — **geo-chem-i-cal-ly** \-k(ə-)lē\ *adv* — **geo-chem-ist** \-kə-mist\ *n*

geo-chro-nol-o-gy \-krə-ˈnä-lə-jē\ *n* (1893) 1 : the chronology of the past as indicated by geologic data 2 : the study of geochronology — **geo-chro-no-log-i-cal** \-krä-nə-ˈlä-ji-kəl, -ˌkrō-\ *also* **geo-chro-no-log-ic** \-ˈlä-jik\ *adj* — **geo-chro-no-log-i-cal-ly** \-ji-k(ə-)lē\ *adv* — **geo-chro-nol-o-gist** \-krə-ˈnä-lə-jist\ *n*

ge-ode \ˈjē-ˌōd\ *n* [L *geodes*, a gem, fr. Gk *geōdēs* earthlike, fr. *gē* earth] (ca. 1732) 1 : a nodule of stone having a cavity lined with crystals or mineral matter 2 : the cavity in a geode

ge-o-de-sic \ˌjē-ə-ˈdē-sik, -ˈdē-, -zik\ *adj* (1821) 1 : GEODETIC 2 : made of light straight structural elements mostly in tension ⟨a ~ dome⟩

geodesic *n* (1883) : the shortest line between two points that lies in a given surface

ge-od-e-sy \jē-ˈä-də-sē\ *n* [Gk *geōdaisia*, fr. *geō-* ge- + *daiesthai* to divide — more at TIDE] (1853) : a branch of applied mathematics concerned with the determination of the size and shape of the earth and the exact positions of points on its surface and with the description of variations of its gravity field — **ge-od-e-sist** \-də-sist\ *n*

geo-det-ic \ˌjē-ə-ˈde-tik\ *also* **geo-det-i-cal** \-ti-kəl\ *adj* [*geodesy*, after such pairs as *heresy*: *heretic*] (ca. 1828) : of, relating to, or determined by geodesy

geodetic survey *n* (1880) : a survey of a large land area in which corrections are made for the curvature of the earth's surface

geo-duck \ˈgü-ē-ˌdək\ *n* [Lushootseed (Salishan language of the Puget Sound region) *gʷídəq*] (1883) : a large edible clam (*Panopea abrupta* syn. *P. generosa*) of the Pacific coast that usu. weighs two to three pounds (about one kilogram) but may attain a weight of over ten pounds (4.5 kilograms)

geo-eco-nom-ics \ˌjē-ō-ˌe-kə-ˈnä-miks, -ˌē-kə-\ *n* (1981) 1 : the combination of economic and geographic factors relating to international trade 2 : a governmental policy guided by geoeconomics — **geo-eco-nom-ic** \-mik\ *adj*

geog *abbr* geographic; geographical; geography

ge-og-ra-pher \jē-ˈä-grə-fər\ *n* (1542) : a specialist in geography

geo-graph-ic \ˌjē-ə-ˈgra-fik\ *or* **geo-graph-i-cal** \-fi-kəl\ *adj* (1559) 1 : of or relating to geography 2 : belonging to or characteristic of a particular region — **geo-graph-i-cal-ly** \-fi-k(ə-)lē\ *adv*

ge-og-ra-phy \jē-ˈä-grə-fē\ *n, pl* **-phies** [L *geographia*, fr. Gk *geōgraphia*, fr. *geōgraphein* to describe the earth's surface, fr. *geō-* + *graphein* to write — more at CARVE] (15c) 1 : a science that deals with the description, distribution, and interaction of the diverse physical, biological, and cultural features of the earth's surface 2 : the geographic features of an area 3 : a treatise on geography 4 a : a delineation or systematic arrangement of constituent elements ⟨the philosophers . . . have tried to construct *geographies* of human reason —*Times Lit. Supp.*⟩ b : MAKEUP 1 ⟨her emotional ~⟩

geo-hy-drol-o-gy \ˌjē-ō-hī-ˈdrä-lə-jē\ *n* (ca. 1909) : a science that deals with the character, source, and mode of occurrence of underground water — **geo-hy-dro-log-ic** \-ˌhī-drə-ˈlä-jik\ *adj* — **geo-hy-drol-o-gist** \-hī-ˈdrä-lə-jist\ *n*

ge-oid \ˈjē-ˌȯid\ *n* [G, fr. Gk *geoeidēs* earthlike, fr. *gē*] (1881) : the surface within or around the earth that is everywhere normal to the direction of gravity and coincides with mean sea level in the oceans — **ge-oi-dal** \jē-ˈȯi-dᵊl\ *adj*

geol *abbr* geologic; geological; geology

geo-log-ic \ˌjē-ə-ˈlä-jik\ *or* **geo-log-i-cal** \-ji-kəl\ *adj* (1791) : of, relating to, or based on geology — **geo-log-i-cal-ly** \-ji-k(ə-)lē\ *adv*

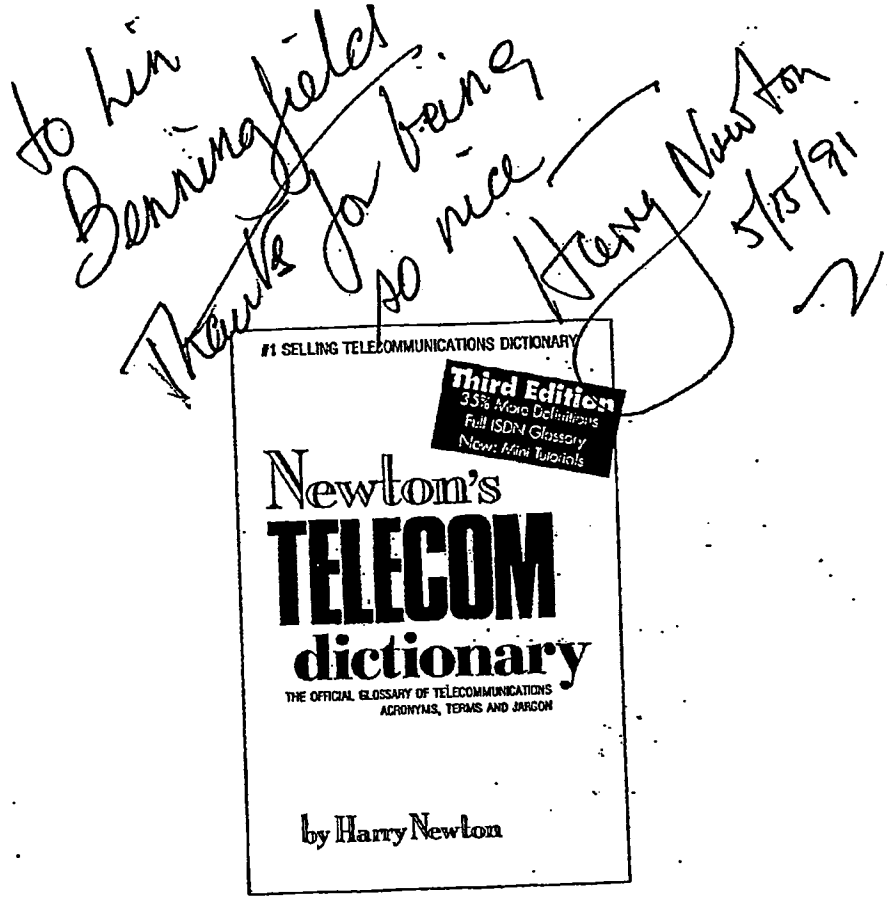
geologic time *n* (1861) : the long period of time occupied by the earth's geologic history

ge-ol-o-gize \jē-ˈä-lə-ˌjīz\ *vi* **-gized; -giz-ing** (1826) : to study geology or make geologic investigations

GEOLOGIC TIME

EONS	ERAS	PERIODS AND SYSTEMS	EPOCHS AND SERIES	BEGINNING OF INTERVAL*	BIOLOGICAL FORMS
Phanerozoic	Cenozoic	Quaternary	Holocene	0.01	
			Pleistocene	1.8	Earliest humans
		Tertiary	Pliocene	5	
			Miocene	24	Earliest hominids
			Oligocene	34	
			Eocene	55	Earliest grasses
			Paleocene	65	Earliest large mammals
Cretaceous-Tertiary boundary (65 million years ago): extinction of dinosaurs					
	Mesozoic	Cretaceous	Upper	98	
			Lower	144	Earliest flowering plants; dinosaurs in ascendancy
		Jurassic		208	Earliest birds
		Triassic		248	Earliest dinosaurs & mammals
	Paleozoic	Permian		286	
		Carboniferous			
			Pennsylvanian	320	Earliest reptiles
			Mississippian	360	Earliest winged insects
		Devonian		410	Earliest amphibians & bony fish
		Silurian		438	Earliest land plants & insects
		Ordovician		505	Earliest corals
		Cambrian		544	Earliest fish
				2500	Earliest colonial algae & soft-bodied invertebrates
				3800	Earliest surviving microfossils of primitive single-celled organisms
				4600	No surviving fossils

*Years before the present


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Bennington
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because their transmissions are provided by different carriers. 2. In packet data communications, a downlink is a link from an NC or PAD to another NC or PAD on a different level. The defining of downlinks and uplinks depends on the network configuration of PADs, their relationships to each other and the direction of data transmission.

DOWNLOADING The act of receiving data from another computer into your computer. It's also called to RECEIVE. The opposite is UPLOAD or TRANSMIT. You have to be very careful distinguishing between the two. Choosing the "Download" option in some communications programs automatically erases a file of the same name that was meant for transmission.

DOWNSTREAM In data communications network, downstream is a session established in an MSTX network when an LU and its PU are powered on and connected. The NC establishes a SSCP LU with the LU.

DOWNSTREAM CHANNEL The frequency multiplexed band in a CATV channel which distributes signals from the headend to the users. Compare with UPSTREAM CHANNEL, the band of frequencies on a CATV channel reserved for transmission from the user to the CATV company's headend.

DOWNTIME The total time a telephone system is not working due to some software or hardware failure. You know your vendor is about to lie when he begins to answer a question about "downtime."

DP Dial Pulse (as in dialing a phone) or Data Processing. Also called EDP for Electronic Data Processing. Now more commonly called Management Information Systems — or MIS.

DPA Digital Port Adapter. A Northern Telecom word.

DPN Lanscope A Northern Telecom software package for remote management of local area networks over wide area networks based on Northern's DPN-100 digital data packet networking system. DPN Lanscope provides fault and performance monitoring, resource management, software distribution and usage tracking for geographically dispersed LANs. Network configuration, status, alarms and performance information are presented to a centralized LAN administrator through a graphics interface.

DPBX Digital PBX.

DPN Northern Telecom term for Data Packet Network.

DPP Distributed Processing Peripheral.

DPU Dynamic Path Update. Allows IBM networks to add new network nodes or change backup routing paths while the front-end is still operating.

DPX DataPath loop extension.

DQDB Distributed Queue Double Bus. IEEE's standard 802.6 for MANs (Metropolitan Area Networks). Formerly called QPSX (Queued Packet and Synchronous Exchange).

DRAFT PROPOSAL An ISO standards document that has been registered and numbered but not yet approved.

keyboard of a terminal. An option of the InteCom PBX.

MNEMONIC PROMPTS System commands represented by the appropriate alphabet letter rather than by a number, (for example, "P" to "Play", "A" to Answer").

MNP Microcom Network Protocol. MNP is a modem standard like the Hayes standard. There are five Classes of MNP modem protocols. Classes 1 through 4 are error checking protocols. Class 5 is a data compression protocol in which the sending modem automatically compresses the file and the receiving modem automatically decompresses the file. MNP Class 5 boosts modem throughput by as much as 200%. MNP Class 5 is the most important protocol. More and more modem manufacturers are beginning to adopt MNP Class 5 protocol. It makes sense to buy only high-speed dial-up modems that support MNP Class 5 protocol.

MNP MICROCOM NETWORKING PROTOCOL A proprietary error-correcting data compression protocol for modems (2.4 to 9.6 Kbps).

MOBILE TELEPHONE Radio telephone service provided to vehicles from a broadcast point located within range of the moving vehicle. The broadcast point in turn can be connected to the public network so that calls can be completed to or from any stationary telephone. See also CELLULAR.

MODAL DISPERSION Digital pulse rounding in lightwave communications that takes place because of the slightly different paths followed by the laser light rays as they arrive at the detector slightly out of phase.

MODEM Acronym for MOdulator/DEModulator. Equipment which converts digital signals to analog signals and vice-versa. Modems are used to send data signals (digital) over the telephone network, which usually is analog. The Modem modulates the "1s" and "0s" into tones which can be carried by the phone network. At the other end, the demodulator part of the modem converts the tones back into digital 1s and 0s.

MODEM ELIMINATOR You can connect a PC to a printer, or a PC to another printer using a cable. But you can only go a certain distance — maybe 100 feet. After that, the traditional solution has been to use a modem and go over traditional phone lines. A newer approach is to connect the two devices directly by wire and use a device called a Modem Eliminator. There are two advantages of a Modem Eliminator over a normal modem. The eliminator is cheaper and it can often transmit faster.

MODEM POOL A collection of modems which a user can dial up from his terminal, access one and use that one to make a data call over the switched telephone network. Modem pools are obviously designed to allow many users to share few modems, thus saving on modems. Now that modems have become less expensive, the advantages of modem pooling are no longer as great. There are also some advantages in having a modem right next to your terminal or computer — namely you can see how it is functioning. And modems have lights to indicate what they're doing. One of the most useful lights on most modems indicates whether the line is "off

BRIDGED TAP Any section of a cable pair not on the direct electrical path between the central office and the user's premises.

BRIDGING ADAPTER A box containing several male and female electrical connectors that allows various phones and accessories to be connected to one cable. Bridging adapters work well with 1A2 key systems and single line phones behind PBXs, not so well with electronic key systems and electronic telephones behind PBXs.

BROADBAND A transmission facility that has a bandwidth (capacity) greater than a voice grade line of 4 kHz. (Some say that to be "broadband" it should be 20 kHz.) Such a broadband facility — typically coaxial cable — may carry numerous voice, video and data channels simultaneously. Each "channel" will take up a different frequency on the cable. There'll be "guardbands" (empty spaces) between the channels to make sure each channel doesn't interfere with its neighbor.

A coaxial CATV cable is the "classic" broadband channel. Simultaneously it carries many TV channels. Broadband cables are used in some office LANs. But more common are the BASEBAND variety which have the capacity for one channel only. Everything on that cable to be transmitted or received must use that one channel. That one channel is very fast, so each device needs only to use that high speed channel for only a little of the time. The problem is getting onto the channel. See BASEBAND.

BROADCAST To send information to two or more receiving devices simultaneously — over a data communications network, a voice mail, electronic mail system, a local TV or radio station or a satellite system.

BROADCAST LIST A list of two or more system users to whom messages are sent simultaneously. Master Broadcast Lists are shared by all system users and are set up by the System Administrator. Personal Lists are set up by individual subscribers.

BROADCAST MESSAGE A message from one user sent to all users. Just like a TV station signal. On LANs, all workstations and devices receive the message. On voice mail systems, broadcast messages are important announcement messages from the system administrator that provide information and instructions regarding the voice processing system. Broadcast messages play before standard Voice Mail or Automated Attendant messages.

BROADCAST NET A British Telecom turret feature that enables each trader single key access to a group of outgoing lines. This is designed primarily for sending short messages to multiple destinations. The "net" function allows the user to set up and amend his broadcast group.

BROADCAST TRANSMISSION A fax machine feature that allows automatic transmission of a document to several locations.

BROKERNET A virtual private dedicated network offering from New York Telephone and provided within Manhattan aimed at brokerage, banking and message industries. It uses digital switching to provide virtual private lines, specifically "hot line" service.

CONTROL EQUIPMENT 1. The central "brains" of a telephone system. That part which controls the signaling and switching to the attached telephones. Known as the KSU (or key service unit) in a key system. 2. Equipment used to transmit orders from an alarm center to remote site to enable you to do things by remote control.

CONTROL SIGNAL Modem interface signal used to announce, start, stop or modify a function. Here's a table showing common RS-232 & CCITT V.24 control signals

Pin	Control Signal	From	To
4	Request-To-Send (RTS)	DTE	DCE
5	Clear-To-Send (CTS)	DCE	DTE
6	Data Set Ready (DSR)	DCE	DTE
8	Carrier Detect (CD)	DCE	DTE
20	Data Terminal Ready (DTR)	DTE	DCE
22	Ring Indicator (RI)	DCE	DTE

CONTROL UNIT An architectural component of a processor chip which orchestrates processor activity and handles timing to make sure the processor doesn't overlap functions.

CONTROL PACKAGE NETWORK A Rolm/IBM term for a multinode network used by the processors in one CBX node to communicate with the processors in other nodes. CPN-1 is used with RolmBus 74. CPN-2 is used with Rolmbus 295. Formerly called HUB.

CONTROLLED ENVIRONMENT VAULT CEV. It is a low maintenance, water-tight concrete or fiberglass container typically buried in the ground which provides permanent housing for remote switches, remote line concentrators, pair gain and fiber transmission systems. Because it is buried, it can often be installed in utility easements or other places where local building laws may be a problem.

CONTROLLER In the true sense, a device which controls the operation of another piece of equipment. In its more common sense, a device between a host and terminals that relays information between them. It administers their communication. Controllers may be housed in the host or on a file server. Typically one controller will be connected to several terminals. The most common controller is the IBM Cluster Controller for their 370 family of mainframes.

CONUS A military term for Contiguous United States (lower 48 states). See CONTIGUOUS UNITED STATES.

CONVECTION COOLING Design techniques used in switching system construction to permit safe heat dissipation from the equipment without the need for cooling fans.

CONVECTOR The device which covers the steam heating radiator in buildings and typically sits underneath a window. Also called a weathermaster.

MEET-ME INTERCOM CONFERENCE Dial a special number ("access code") and any telephone can join an intercom conference call.

MEET-ME PAGE A feature which allows a person to answer an intercom page from any phone in the system.

MEGA A prefix meaning one million, also represented as an M. MEGABIT = one million bits. MEGABYTE = one million bytes. MEGAHERTZ = one million cycles per second.

MEGACOM Megacom 800 and Megacom. Two AT&T services which are variations on INWATS and OUTWATS. Both are normal WATS services except that the local lines to and from the customer's office to and from AT&T's serving class 4 central office are the responsibility of the customer. Such lines tend to be T-1. And they are usually direct wiring through the local phone company, or short-haul microwave, or leased fiber optic.

MEGAFLOPS Millions of floating point operations per second. A measure of computer performance.

MEMORY The part of a computer or sophisticated phone system which stores information or instructions for use. Memory comes in many variations. There is memory which is lost when the power is switched off. There is memory which is retained when power is turned off.

MEMORY ADMINISTRATION MA. A set of functions that provide network system database updates, network system database integrity, network system database security and network system database backup and restoration. Definition from Bellcore in reference to its concept of the Advanced Intelligent Network.

MEMORY MAP An indication of what type of data is stored where in a computer's RAM memory.

MEMORY RESERVE POWER The operating voltage, generally provided by a battery, which supplies power to the memory modules when your commercial power fails. You should check your memory reserve power before it's too late. You should test it even when you don't need it.

MENU Options displayed on a computer terminal screen or spoken by a voice processing system. The user can choose what he wants done by simply choosing a menu option — either typing it on the computer keyboard, hitting a touchtone on his phone or speaking a word or two. There are basically two ways of organizing computer or voice processing software — menu-driven and non-menu driven. Menu-driven programs are easier to use but they can only present as many options as can be reasonably crammed on a screen or spoken in a few seconds. Non-menu driven screens allow more alternatives but are much more complex and frightening. It's the difference between receiving a bland "A" or "C" prompt on the screen — as in MS-DOS and receiving a menu of "Press A if you want Word Processing," "Press B if you want Spread Sheet," etc. It's very easy to write menus in MS-DOS using BATch files. See also AUDIO MENUS and PROMPTS.

MERLIN COMMUNICATIONS SYSTEMS Five microprocessor based key/hybrid phone systems from AT&T — the 206, 410, 820, 1030 and 3070.

WESTAR Family of communications satellites owned and operated by Western Union.

WET CIRCUIT A circuit carrying direct current.

WET LOOP POWERING Defined as local power (non-Span provided) with use of copper pairs (power is looped at the last repeater).

WET T-1 A T-1 line with a Bell Operating Company powered interface.

WETTING AGENT A chemical which reduces surface tension in a liquid, motivating the liquid to spread more evenly on a surface.

WHITE NOISE Noise (as compared to information) whose frequency is broad and uniform. The garbage you hear behind a phone conversation. The noise you hear when you're trying to sleep somewhere — anywhere — in New York City. White noise is fairly equally distributed across all frequencies.

WHO-ARE-YOU CODE WRU. A control character which operates the answerback unit in a terminal (typically a telex terminal) for identification of sending and receiving stations in a network.

WIDE AREA NETWORK WAN. An data network typically extending a LAN (local area network) outside the building, over telephone common carrier lines to link to other LANs in remote buildings in possibly remote cities. A WAN typically uses common-carrier lines. A LAN doesn't. WANs typically run over leased phone lines — from one analog phone line to T-1 (1.544 Mbps). The jump between a local area network and a WAN is made through a device called a bridge or a router. Bridges operate independently of the protocol employed. They will work, according to Jeff Weiss, of Cryptall Communications, with all present and expected future communications packages. Routers are specific to the protocol being employed. New routing software is needed for each new protocol or protocol deviation. See BRIDGE, ROUTER and DIGITAL HIERARCHY.

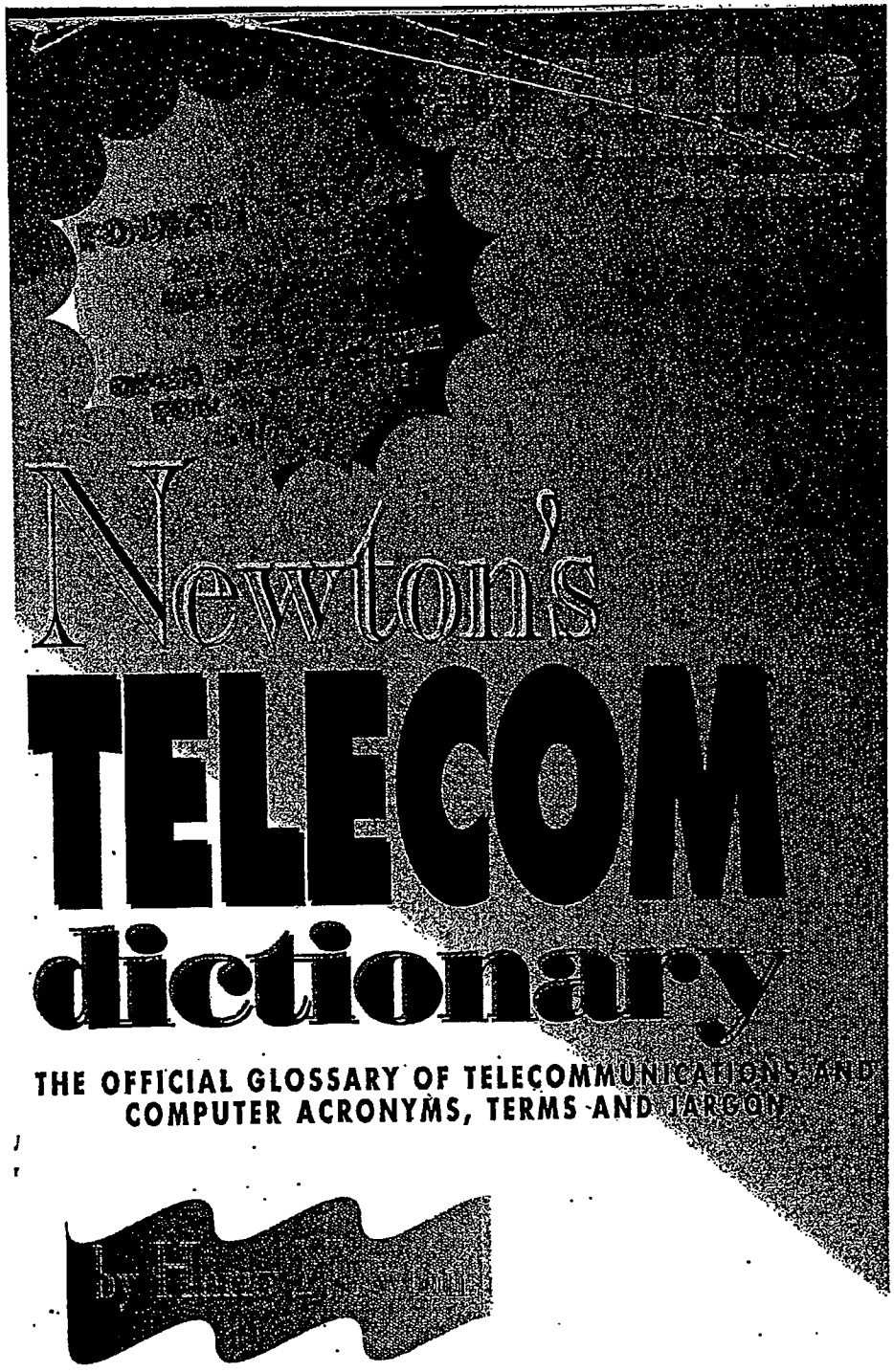
WIDE AREA TELEPHONE SERVICE See WATS and 800 SERVICE.

WIDE FREQUENCY TOLERANT POWER PLANT PBX power facilities are provided that will operate from AC energy sources which are not as closely regulated as commercial AC power. The wide tolerant plant will tolerate average frequency deviations of up to plus or minus 3 Hz or voltage variations of -15% to +10% as long as both of the conditions do not occur simultaneously. This feature permits operation with customer provided emergency power generating equipment.

WIDEBAND Refers to a channel wider in bandwidth than a voice-grade channel.

WIDEBAND PACKET TRANSPORT Transmission of addressed, digitized message fragments (packets) interleaved among the addressed fragments of other messages at a rate high enough to support general purpose telecommunications services.

WIDEBAND SWITCH Switch capable of handling channels wider in bandwidth than voice-grade lines. Radio and TV switches are examples of


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DOV Data Over Voice. A technology used primarily with local Centrex services or special customer premises PBXs for transmitting data and voice simultaneously over twisted-pair copper wiring. Typical data rates for Centrex operation are 9.6 Kbps and 19.2 Kbps.

DOVPATH TRANSPORT SERVICE A New York and New England Telephone service which lets you transmit both voice and data simultaneously on one phone line. The data is carried on a higher frequency, i.e. "Over the Voice." Hence the name Data Over Voice, or DOV. DOVPATH lets you transmit up to 19.2 Kbps asynchronous data, which could be fast enough for talking to a distant mainframe computer.

DOWNLINE LOADING A system in which programs are loaded into the memory of a computer system, such as a LAN bridge, router or server, via the same communication line(s) the system normally uses to communicate with the rest of a network. As opposed to systems in which all programs are loaded into the computer from a disk or tape associated with the computer. A PC connected to a LAN may use this type of loading when it is first turned on in the morning to get the information it needs from a file server. Diskless PCs always work this way.

DOWNLINK 1. The part of a transmission link reaching from a satellite to the ground. Some satellite transmission circuits, especially international ones, are priced and billed separately for the uplink and the downlink. This is because their transmissions are provided by different carriers. 2. In packet data communications, a downlink is a link from an NC or PAD to another NC or PAD on a different level. The defining of downlinks and uplinks depends on the network configuration of PADs, their relationships to each other and the direction of data transmission.

DOWNLOADING The act of receiving data from another computer into your computer. It's also called to RECEIVE. The opposite is UPLOAD or TRANSMIT. You have to be very careful distinguishing between the two. Choosing the "Download" option in some communications programs automatically erases a file of the same name that was meant for transmission.

DOWNSTREAM CHANNEL The frequency multiplexed band in a CATV channel which distributes signals from the headend to the users. Compare with UPSTREAM CHANNEL, the band of frequencies on a CATV channel reserved for transmission from the user to the CATV company's headend.

DOWNTIME The total time a telephone system is not working due to some software or hardware failure. You know your vendor is about to lie when he begins to answer a question about "downtime."

DP Dial Pulse (as in dialing a phone) or Data Processing. Also called EDP or Electronic Data Processing. Now more commonly called Management Information Systems — or MIS.

DPA Digital Port Adapter. A Northern Telecom word.

DPLB Digital Private Line Billing

DPN Lanscope A Northern Telecom software package for remote

MMR Modified Modified Read data compression method.

MMSU Modular Metallic Service Unit.

MNEMONIC A shorthand label or term that is easy to remember, usually made up from the initials of the words in a term or process: LASER is a mnemonic. See LASER.

MNEMONIC DIAL PLAN A way of dialing using characters typed on the keyboard of a terminal. An option of the InteCom PBX.

MNEMONIC PROMPTS System commands represented by the appropriate alphabet letter rather than by a number, (for example, "P" to Play", "A" to Answer").

MNP A proprietary error-correcting and data compression protocol for dial-up modems from 2.4 to 14.4 Kbps. See MICROCOM NETWORKING Protocol for a full explanation.

MOBILE CELLULAR PHONE Also known as a ~stationary phone~; refers to a cellular handset unit that is permanently mounted in a vehicle.

MOBILE TELEPHONE Radio telephone service provided to vehicles from a broadcast point located within range of the moving vehicle. The broadcast point in turn can be connected to the public network so that calls can be completed to or from any stationary telephone. See also CELLULAR.

MODAL DISPERSION Digital pulse rounding in lightwave communications that takes place because of the slightly different paths followed by the laser light rays as they arrive at the detector slightly out of phase.

MODE Mode is essentially a switch inside a microprocessor that makes it run like another microprocessor chip. So when you're running MS-DOS on your new 80386 80486 computer, you're still running with only 20 bits of address and consequently only a a one megabyte address space. This is called operating in real mode and the lower 1 MB of addressable memory in real mode is called conventional memory. One solution to the lack of memory in an IBM PC or IBM clone is EMS, also called Expanded Memory Specification.

MODEM Acronym for MOdulator/DEModulator. Equipment which converts digital signals to analog signals and vice-versa. Modems are used to send data signals (digital) over the telephone network, which usually is analog. The Modem modulates the "1's" and "0's" into tones which can be carried by the phone network. At the other end, the demodulator part of the modem converts the tones back into digital 1's and 0's.

MODEM ELIMINATOR A wiring device designed to replace two modems; it connects equipment over a distance of up to several hundred feet. In asynchronous systems, this is a simple cable. Here is a specific application using a Modem Eliminator: You can connect a PC to a printer, or a PC to another printer using a cable. But you can only go a certain distance -- maybe 100 feet. After that, the traditional solution has been to use a modem and go over traditional phone lines. Instead, you can connect the

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In video displays, a measure of image clarity. A video display's dot pitch is the vertical distance, expressed in millimeters, between like-colored pixels. A smaller dot pitch generally means a crisper image; for example, a monitor with a .28 mm dot pitch displays an image more clearly than a monitor with a .31 mm dot pitch, although the difference between the two can vary because some manufacturers use different methods to determine the dot pitch of their products. A display's dot pitch is an integral part of the product and so cannot be altered. *See also* CRT, display.

dots per inch Abbreviated dpi. A measure of screen and printer resolution that is expressed as the number of dots that a device can print or display per linear inch.

double buffering Also known as ping-pong buffering. The use of two temporary storage areas (buffers) rather than one to hold information coming from and going to a particular input/output device. Because one buffer can be filled while the other is being emptied, double buffering increases the speed at which information can be transferred.

double-click To press and release a mouse button twice without moving the mouse. Double-clicking is a means of rapidly selecting and activating a program or program feature. *Compare* click, drag.

double dabble A method of converting binary numbers to decimals by a process of doubling sums and adding successive bits: doubling the bit farthest to the left, adding the next bit and doubling the sum, adding the next bit, doubling the sum, and so on until the rightmost bit has been included in the total.

double-density disk A disk created to hold data at twice the density (bits per inch) of a previous generation of disks. Early IBM PC floppy disks held 180 kilobytes (KB) of data. Double-density disks increased that capacity to 360 KB. Double-density disks use modified frequency modulation encoding for storing data. *Compare* high-density disk.

double-dereference To dereference a pointer that is pointed to by another pointer; in other words, to access the information pointed to by a handle. *See also* dereference, handle, pointer.

double-precision An adjective that describes a number stored in twice the amount (two words—typically 8 bytes) of computer memory that is required for storing a less precise (single-precision) number. Double-precision numbers are commonly handled by a computer in floating-point form. Languages such as BASIC and C provide ways for programmers to specify double-precision numbers; number-handling hardware and software such as math coprocessor chips and the Standard Apple Numerics Environment are designed to work rapidly with such numbers.

double-sided disk A floppy disk that can hold data on both its top and bottom surfaces.

double-strike On an impact printer (such as a daisy-wheel printer), the process of printing twice over a word, producing text that appears darker and heavier, or bolder, than it normally appears. On dot-matrix printers, double-striking with a slight offset can be used to fill in the space between the dots, producing smoother and darker characters.

double word A unit of data consisting of two contiguous words (connected bytes, not text) that are handled together by a computer's microprocessor.

doubly linked list A series of nodes (items representing discrete segments of information) in which each node refers to both the next node and the preceding node. Because of these two-way references, a doubly linked list can be traversed both forward and backward, rather than in one direction (forward) only, as with a singly linked list.

down Not functioning; used in reference to computers, printers, communications lines on networks, and other such hardware.

downlink The transmission of data from a communications satellite to an earth station.

download In communications, the process of transferring a copy of a file from a remote computer to the requesting computer by means of a modem or network. With a modem-based communications link, the process generally involves

the requesting computer instructing the remote computer to begin the transfer and the requesting computer saving the incoming file on disk. Also, to send a block of data, such as a PostScript file, to a dependent device, such as a PostScript printer. *Compare* upload; *see also* downloadable font.

downloadable font A set of characters of a particular style and size stored on disk and sent (downloaded) to a printer's memory when needed for printing a document. Downloadable fonts are available in many typefaces and sizes and are most commonly used with laser printers and other page printers, although many dot-matrix printers can also accept some of them.

downtime The amount or percentage of time a computer system or associated hardware remains nonfunctioning. Although downtime can occur because hardware fails unexpectedly, it can also be a scheduled event, as when a network is shut down to allow time for maintenance, a change in hardware, or archiving of files.

downward compatibility Source code or programs developed on a more advanced system or compiler version that can still be executed or compiled by a less advanced (older) version. For example, a developer writing an assembly language routine on an 80386 system might choose the instructions carefully so as to maintain downward compatibility with the 8086 processor. *Compare* upward compatibility.

DP *See* data processing.

dpi *See* dots per inch.

DPMI Abbreviation for DOS Protected Mode Interface. A software interface, originally developed for Microsoft Windows version 3.0, that enables MS-DOS–based application programs to run in the protected mode built into 80286 and higher microprocessors. In protected mode, the microprocessor can support multitasking and use of memory beyond 1 MB—capabilities that are not native to the MS-DOS operating system and so are unavailable to programs designed to run under MS-DOS. By providing software support for switching the microprocessor between real (MS-DOS) mode and protected mode, DPMI supplies a base for extending the effectiveness of an 80286 or better-equipped computer by enabling MS-DOS–based software to escape the 640-KB memory restriction of a computer running in real mode. *Compare* protected mode, real mode, VCPI.

DPSK Abbreviation for differential phase-shift keying. *See* phase-shift keying.

draft mode A high-speed, relatively low-quality print mode offered by most dot-matrix printers. To increase speed, draft mode uses a matrix with fewer dots. If the printer operates in more than one mode, the user can select draft mode when print quality is not important and, when printing a final copy, select one of the printer's higher-quality modes, usually called letter-quality, near-letter-quality, or correspondence mode. *See also* dot-matrix printer, draft quality, print quality.

draft quality A low grade of printing generated by the draft mode on dot-matrix printers. It typically has less-well-defined characters than do higher-quality print modes. Depending on the printer's overall print quality, draft quality might be suitable for most tasks, excluding business correspondence, or it might be almost useless. *See also* draft mode, print quality.

drag In computer graphics, to move an image or a window from one place on the screen to another by "grabbing" it and pulling it to its new location. With a mouse, *drag* means to hold down a mouse button while moving the mouse. If the mouse pointer is on top of a movable object at the time the mouse button is pressed, dragging the mouse also moves the object. In other circumstances, dragging the mouse can select blocks of text, move icons on a desktop, resize a window, and so on.

drain *See* current drain.

DRAM *See* dynamic RAM.

DRAW Acronym for direct read after write, a technique used with optical discs to verify the accuracy of information immediately after it has been recorded (written) on the disc. If errors are found, the information is rerecorded in another location, and the table that records the location of information is updated so that the incorrect version of the information is always bypassed. Some

matical formulas can be used to manipulate the data, to develop business plans and projections, or to evaluate the impact of proposed changes on the company's operations and financial status. *See also* spreadsheet program.

Geometric modeling uses mathematics to describe objects and, if necessary, the spatial relationships between or among them. CAD programs, for example, are used to create on-screen representations of such physical objects as tools, office buildings, complex molecules, and automobiles. Thus, geometric models rely on equations to create lines, curves, and other shapes and to place those shapes accurately in relation to each other and to the two-dimensional or three-dimensional space in which they are drawn. Coloring and substance are provided by a process called rendering, which displays the image from a certain viewpoint and uses additional mathematics to simulate the effects of light and shade on the object. *See also* CAD, rendering, simulation, solid model, surface modeling, three-dimensional model, two-dimensional model, wire-frame model.

modem Short for modulator/demodulator, a communications device that enables a computer to transmit information over a standard telephone line. Because a computer is digital (works with discrete electrical signals representing binary 1 and binary 0) and a telephone line is analog (carries a signal that can have any of a large number of variations), modems are needed to convert digital to analog and vice versa. When transmitting, modems impose (modulate) a computer's digital signals onto a continuous carrier frequency on the telephone line. When receiving, modems sift out (demodulate) the information from the carrier and transfer it in digital form to the computer. Modems operating over telephone lines typically transmit at speeds ranging from 300 baud to 9600 baud. Modems operating on leased lines can transmit reliably at 19,200 baud. Higher rates of operation are also possible but are generally constrained by the limitations of the telephone lines themselves. Sophisticated modems, aside from transmitting and receiving, are also capable of such functions as automatic dialing, answering, and redialing. Without appropriate communications software, however, modems cannot perform any useful work. *See also* baud rate.

modem eliminator A device that enables two computers to communicate without modems. *See also* null modem.

modified frequency modulation encoding Abbreviated MFM encoding. A widely used method of storing data on disks. MFM encoding is based on an earlier technique called frequency modulation encoding but improves on its efficiency by reducing the need for synchronizing information and by basing the magnetic coding of each bit on the status of the previously recorded bit. MFM encoding stores more information on a disk than does frequency modulation encoding and is used on many hard disks. It is not, however, as efficient a space saver as the technique known as run-length limited encoding, or RLL. *Compare* frequency modulation encoding, run-length limited encoding.

modify structure An operator available in some database management systems that permits fields (columns) to be added or deleted without the need to rebuild the entire database.

Modula-2 A modular high-level language designed in 1980 by Niklaus Wirth. Derived from Pascal, Modula-2 is noted for its emphasis on modular programming, its early support for data abstraction, and its lack of standard functions and procedures. *See also* modular programming.

modular design An approach to designing hardware or software in which a project is broken into smaller units, or modules, each of which can be developed, tested, and finished independently before being combined with the others in the final product. Each unit is designed to perform a particular task or function and can thus become part of a "library" of modules that can often be reused in other products having similar requirements. In programming, for example, one module might consist of instructions for moving the cursor in a window on the screen. Because it is deliberately designed as a stand-alone unit that can work with other sections of the program, the

same candle under incandescent lights. Although its subjective value cannot be measured with physical instruments, brightness can be measured as degrees of luminance (radiant energy). The brightness component of a color is different from its color (the hue) and from the intensity of its color (the saturation). *See also* color model, HSB.

broadband network A type of local area network, such as WangNet, on which transmissions travel as radio-frequency signals over separate inbound and outbound channels. Stations on a broadband network are connected by coaxial or fiber-optic cable. The cable itself can be made to carry data, voice, and video simultaneously over multiple transmission channels. This is accomplished by a technique called frequency-division multiplexing, in which individual channels are separated by frequency and are buffered from one another by guard bands of frequencies unused in transmission. A broadband network is capable of high-speed operation (20 megabits or more), but it is more expensive than a baseband network and can be difficult to install. Such a network is based on the same technology used by cable television (CATV). Broadband transmission is sometimes called wideband transmission. *Compare* baseband network.

broadcast As in radio or television, a transmission sent to more than one recipient. In communications and on networks, a broadcast message is one distributed to all stations.

brownout A condition in which the electricity level is appreciably reduced for a sustained period of time. In contrast to a blackout, or total loss of power, a brownout continues the flow of electricity to all devices connected to electrical outlets, although at lower levels than the normally supplied levels (120 volts in the United States). A brownout can be extremely damaging to sensitive electronic devices such as computers because the reduced, and often fluctuating, voltage levels can cause components to operate outside the range they were designed to work in for extended periods of time. On a computer, a brownout is characterized by a smaller, dimmer, and somewhat fluctuating display area on the monitor and potentially erratic behavior by the system unit. The only reliable means of preventing damage caused by a brownout condition is to use a battery-backed uninterruptible power supply (UPS). *Compare* blackout; *see also* uninterruptible power supply.

browse To scan a database or a list of files, either for a particular item or for anything that seems to be of interest; generally, an activity that implies observing, rather than changing, information.

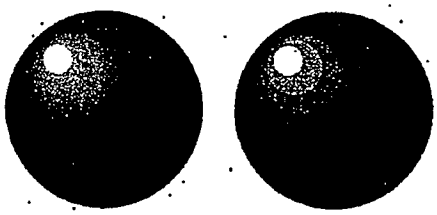
In unauthorized computer hacking, browsing is a (presumably) nondestructive means of finding out about an unknown computer after illegally gaining entry.

brush In computerized paint programs, a tool used to sketch or fill in areas of a drawing with the color and pattern currently in use. In programs such as MacPaint and Microsoft Paintbrush, the brush is chosen by selecting an on-screen paintbrush icon. Paint programs that offer a variety of brush shapes can produce brushstrokes of varying width and, in some cases, shadowing or calligraphic effects.

BSC *See* BISYNC.

BSD, UNIX Abbreviation for Berkeley Software Distribution UNIX—versions of the UNIX system that were developed at the University of California at Berkeley. BSD innovations included support for virtual memory, networking, job control, interprocess communication, and enhancements to the file system and to system security. *See also* UNIX.

B-tree A tree structure especially well suited to storing database indexes. In a simple index structure, index values and pointers to records or rows that contain those values are stored sequentially, usually in ascending sequence. If the data being indexed is stored in many records, the time required to search for high index values can be very long. In a B-tree index structure, special entries exist in the tree to allow the database to quickly find any simple index entry without having to scan the entire tree. As shown in the illustration, the first block, or root, of the tree contains entries that indicate the highest value in each



Contouring.

Control-Break *See* Break key.

control character Most commonly, one of the first 32 characters in the ASCII character set (0 through 31 in decimal representation), each of which is defined as having a standard control function, such as carriage return, linefeed, or backspace. The term is occasionally used to refer only to the 26 characters, Control-A through Control-Z (1 through 26 in decimal representation), that can be typed at the keyboard by holding the Control key down and typing the appropriate letter. The six remaining characters with control functions, such as Escape (ASCII 27), cannot be typed with the Control key.

Control character should not be confused with *Control key combination*, although both are written the same way. A Control key combination is often a command in an application program that is given by holding the Control key down while pressing some other key.

Although the term *control character* is often used interchangeably with *control code* in microcomputer publications, a semantic distinction is made here: *control character* refers to a single character, such as carriage return, linefeed, or backspace; *control code* refers to a single command, such as a command to a printer to advance to the next page or to turn boldfacing on or off. Usually, a control code consists of two or more control characters, typically starting with the Escape control character.

control code One or more nonprinting characters used by a computer program to control the actions of a device; used in printing, communications, and management of display screens. Control codes, sometimes called setup strings or escape sequences, are usually encountered by computer users in relation to printers. Control codes are typically preceded by an Escape character, and some may end with a terminating character; these characters tell the printer to interpret all characters in between as commands rather than as data. Printer control codes vary by make and model and are listed in the manual supplied with each printer. They are mainly employed by programmers or by users to control a printer when an application program does not support the printer or one of its specialized features.

In video, control codes are sent from a computer to a display unit to manipulate the appearance of text or a cursor on the screen. Popular video control code sets are ANSI and VT-100. *See also* control character.

control console *See* console.

control data Typically, data that consists of information about timing and switching, used to synchronize and route other data or to manage the operation of a device such as a bus or a port.

Control key A key that, when pressed in combination with another key, gives the other key an alternative meaning. In many application programs, Control plus another key is used as a command for special functions; for example, pressing Control-U (Control plus the letter U) might be the command to undo the last change, or to go up one page. In some cases, the Control key combination can enter a control character; for example, using Control-L in a word-processing program enters the command to start a new page. *See also* control character.

controller A device upon which other devices rely for access to a computer subsystem. A disk controller, for example, controls access to one or more disk drives, managing physical and logical access to the drive or drives.

control logic The electronic circuitry that generates, interprets, and uses control data.

Control Panel On the Apple Macintosh, a desk accessory that is used to control certain system parameters such as screen colors, speaker volume, cursor blink rate, and the system date and time.

up to 1 megabyte (MB) for code. *See also* memory model.

medium-scale integration Abbreviated MSI. A term describing the concentration of between 10 and 100 circuit elements on a single chip. *See also* integrated circuit.

meg Abbreviation for megabyte or megabytes, as in "a 30-meg hard disk."

mega- Abbreviated M. A prefix meaning 1 million (10^6). In computing, which is based on the binary (base-2) numbering system, *mega-* has a literal value of 1,048,576, which is the power of 2 (2^{20}) closest to one million.

megabit Abbreviated Mb or Mbit. Usually 1,048,576 bits; sometimes interpreted as 1 million bits.

megabyte Abbreviated MB. Either 1 million bytes or 1,048,576 bytes (2^{20}).

megacycle Abbreviated mc. A term for 1 million cycles—usually used to mean 1 million cycles per second. *See also* megahertz.

megaflops *See* MFLOPS.

megahertz Abbreviated MHz. A measure of frequency equivalent to 1 million cycles per second.

megapel display *See* megapixel display.

megapixel display A video display capable of displaying at least one million pixels. For example, a video display with a screen size of 1024 horizontal pixels and 1024 vertical pixels is a megapixel display.

member In object-oriented programming, a variable or routine that is part of a class; also, a value that is part of a set data structure. *See also* C++, class, set.

membrane keyboard A keyboard in which an unbroken plastic or rubber shell (a membrane) covers keys that have little or no travel (movement). Rather than using normal, full-travel keys, membrane keyboards use pressure-sensitive areas that are sometimes, but not always, defined by small bumps under the membrane. Today such keyboards are used primarily on printers or in devices targeted for use in areas where environmental hazards such as dirt or liquid might damage a normal keyboard.

memo field A field in a database file that can contain unstructured text.

memory Circuitry that allows information to be stored and retrieved. In the most general sense, *memory* can refer to external systems such as disk drives or tape drives; in common usage, it refers only to the fast semiconductor storage (RAM) directly connected to the processor. *Compare* bubble memory, core.

memory cartridge A plug-in module containing RAM (random access memory) chips that can be used to store data or programs. Memory cartridges are used primarily in portable computers as smaller, lighter—and more expensive—substitutes for disk drives. Memory cartridges typically use either a nonvolatile form of RAM, which does not lose its contents when power is turned off, or battery-backed RAM, which maintains its contents by drawing current from a rechargeable battery within the cartridge.

memory management unit Abbreviated MMU. The hardware that supports the mapping of virtual memory addresses to physical memory addresses. In some systems, such as those based on the 68020, the MMU is separate from the processor. In most modern microcomputers, however, the MMU is built into the CPU chip. In some systems, the MMU provides interfacing between the microprocessor and memory. This type of MMU is typically responsible for address multiplexing and, in the case of DRAMs, refreshing. *See also* physical address, virtual address.

memory model The approach used to address the code and the data that are used in a computer program. The memory model dictates how much memory can be used in a program for code and how much for data. Most computers with a flat address space support only a single memory model. Computers with a segmented address space usually support multiple memory models. *See also* compact model, flat address space, huge model, large model, medium model, segmented address space, small model, tiny model.

memory typewriter An electric typewriter with internal memory and, typically, a one-line liquid crystal display for viewing the contents of that memory. Memory typewriters can usually hold one page of text at a time, and they allow small

the accuracy and status of the transmission. *Compare* header.

trailer label A small block of information used in tape processing that marks the end of a file or the end of the tape and that can contain other information, such as the number of records in the file or files on the tape.

Also, a label used in communications data frames, or packets, that follows the data and might contain an end-of-message mark, a checksum, and some synchronization bits. *Compare* header label.

trailing edge The latter part of an electronic signal. If a digital signal switches from off to on and then back to off, the transition from off to on is the leading edge and the transition from on to off is the trailing edge of the signal.

train As a verb, to teach someone to perform a particular task or job. As a noun, a sequence of items or events, such as a digital pulse train consisting of transmitted binary signals.

transaction A discrete activity within a computer system—for example, an entry of a customer order or an update of an inventory item. Transactions are usually associated with database management, order-entry, and other online systems. By definition, however, making a deletion or creating a file copy on a microcomputer could as easily be considered a transaction.

transaction file A file that contains the details of transactions, such as items and prices on invoices, and that is to be used to update a master database file. Transaction files are typical of transaction-based systems, such as those composed of online order-entry terminals that are connected to a main computer.

transaction processing A processing method in which transactions are executed immediately after they are received by the system. *Compare* batch processing.

transceiver A device that can both transmit and receive signals; derived from *transmitter/receiver*. Transceivers are used for a variety of communications, among them telephones, citizens band radio, and ship-to-shore or air-to-ground radio. On local area networks, a transceiver is the device that connects a computer to the network.

transducer A device that converts one form of energy into another. Electronic transducers either convert electric energy to another form of energy or convert nonelectric to electric energy. For example, a loudspeaker transduces electric energy to sound, and a microphone transduces sound to electric energy.

transfer The movement of data from one location to another, or the passing of program control from one portion of code to another.

transfer rate The rate at which a circuit or a communications channel transfers information from source to destination, as over a network or to and from a disk drive. The transfer rate is measured in units of information per unit of time—for example, bits per second or characters per second—and can be measured either as a raw rate, which is the maximum transfer speed, or as an average rate, which includes gaps between blocks of data as part of the transmission time.

transfer statement A statement in a programming language that transfers the flow of execution to another location in the program. *See also* GOTO statement.

transfer time The time elapsed between the start of a data-transfer operation and its completion.

transform In general, to change the appearance or format of data without altering its content—for example, to encode information according to predefined rules. In mathematics and computer graphics, *transform* means to alter the position, size, or nature of an object by moving it to another location (translation), making it larger or smaller (scaling), turning it (rotation), changing its description from one type of coordinate system to another, and so on.

transformer A device used to change the voltage of an alternating current signal or to change the impedance of an alternating current circuit. See the illustration. A transformer consists of two or more coils or windings of wire, usually wrapped around a ferromagnetic core. The individual windings are not electrically connected to each other but are coupled by magnetic induction. As

References to transistors often mention bipolar transistors and field-effect transistors. In the former, the three terminals are called the base, emitter, and collector; in the latter, the terminals are known as the gate, source, and drain. *See also* FET.

transistor-transistor logic Abbreviated TTL. A type of bipolar circuit design that utilizes transistors connected to each other either directly or through resistors. TTL offers high speed and good noise immunity and is used in many digital circuits. A large number of TTL gates can be fabricated on a single integrated circuit.

translate In programming, to convert a program from one language to another—for example, to convert the source code of a program written in the C language to object code that represents the same instructions or a close approximation in machine language. Translation is performed by special programs such as compilers, assemblers, and interpreters.

In computer graphics, to move an image in the "space" represented on the display, but without turning (rotating) the image.

translator A program that translates one language or data format into another. Compilers, assemblers, and macro processors can all be thought of as translators.

transmission The sending of information over a communications line or a circuit. Computer transmissions can take place in any of a number of ways, as outlined below:

- asynchronous (variable timing) or synchronous (exact timing)
- serial (essentially, bit by bit) or parallel (byte by byte; a group of bits at once)
- duplex or full-duplex (simultaneous two-way communication), half-duplex (two-way communication in one direction at a time), or simplex (one-way communication only)
- burst (intermittent transmission of blocks of information)

transmission channel *See* channel.

Transmit Data *See* TXD.

transmitter Any circuit or electronic device designed to send electrically encoded data to another location.

transparent In computer use, an adjective describing a device, function, or part of a program that works so smoothly and easily that it is invisible to the user. For example, the ability of one application to use files created by another is transparent if the user encounters no difficulty in opening, reading, or using the second program's files or doesn't even know the use is occurring.

In communications, an adjective describing a mode of transmission in which data can include any characters, including device-control characters, without the possibility of misinterpretation by the receiving station—for example, early termination because the data contains a character that the receiving device interprets as "end of transmission." Communications protocols allow for two methods of achieving transparency: character (byte) stuffing and bit stuffing. An extra byte or bit is added to any data that could be misinterpreted as a control character; for example, a 0 (zero) might be inserted after five consecutive 1's of data because six 1's in a row can appear only at the beginning or end of a transmission. The receiving station removes the extra bytes or bits to return the data to its original condition.

transponder A transceiver in a communications satellite that receives a signal from an earth station and retransmits it on a different frequency to one or more other earth stations.

transportable computer *See* portable computer.

Transport Control Protocol/Interface Program *See* TCP/IP.

transport layer The fourth of the seven layers in the International Organization for Standardization's Open Systems Interconnection (OSI) model for standardizing computer-to-computer communications. The transport layer is one level above the network layer and is responsible for both quality of service and accurate delivery of information. Among the tasks performed on this layer are error detection and correction. It is the highest of the three layers (data-link, network,

is used to refer to the time-amplitude profile of an electrical signal.

waveform A general term used to refer to the manner in which a wave's amplitude changes over time. *See also* period, phase, wavelength.

wavelength The distance between successive peaks or troughs in a periodic signal that is propagated through space. Wavelength is symbolized by the Greek letter lambda (λ). Wavelength is directly related to the frequency of the signal and the speed of propagation, and it can be calculated as speed divided by frequency. For electromagnetic radiation, wavelength in meters equals 300,000,000 meters per second divided by frequency in hertz. For sound traveling through air, wavelength in meters equals 335 meters per second divided by frequency in hertz.

weak typing A characteristic of a programming language, such as C, that allows the program to change the data type of a variable during program execution. *Compare* strong typing; *see also* data type, variable.

weighted code Data representation code in which each bit position has a specified inherent value, which might or might not be included in the interpretation of the data, depending on whether the bit is on or off.

well-behaved An adjective describing a program that performs properly, even when given extreme or erroneous input values. A program that obeys the rules of a particular programming environment can also be described as well-behaved. Operating-system vendors often promise that well-behaved programs will be upwardly compatible with future enhancements of the operating system.

"what-if" evaluation A kind of spreadsheet evaluation in which certain values in a spreadsheet are changed in order to reveal the effects of those changes—for example, trying different mortgage rates and terms to see the effect on monthly payments and on total interest paid over the life of the loan. Spreadsheet programs allow values in an existing model to be changed and recalculated with little effort, so these programs are considered ideal for the otherwise tedious task of preparing and comparing financial alternatives.

wheel printer *See* daisy-wheel printer.

Whetstone A benchmark test that attempts to measure the speed and efficiency with which a computer carries out floating-point operations. The result of the test is given in units called whetstones. The Whetstone benchmark has fallen out of favor because it produces inconsistent results compared to other benchmarks such as the Dhrystone and the sieve of Eratosthenes. *See also* benchmark, Dhrystone, sieve of Eratosthenes.

white noise Noise that contains components at all frequencies; at least within the frequency band of interest. It is called "white" by analogy to white light, which contains light at all the visible frequencies. In the audible spectrum, white noise is a hiss or a roar, such as that produced when a television set is tuned to a channel over which no station is broadcasting.

whole number A number without a fractional component—for example, 1 or 123; an integer.

wide area network A communications network that connects geographically separated areas.

wideband *See* broadband network.

widow A single word, a portion of a word, or a few short words left on a line by themselves at the end of a paragraph or column of type on a page. A widow is considered visually undesirable on the printed page. Because it is short, however, a widow can generally be eliminated by editing or rebreaking preceding text. *Compare* orphan.

wildcard character A keyboard character that can be used to represent one or many characters; usually encountered with operating systems as a means of specifying more than one file by name. In MS-DOS, for example, the question mark (?) wildcard character can be used to represent any single character, and the asterisk (*) can be used to represent any number of characters. Thus, ?OOK.DOC would refer to BOOK.DOC, COOK.DOC, LOOK.DOC, and so on; *.DOC would refer to any filename ending in the extension .DOC; and *.* would refer to any filename and any extension—in other words, to all files on the specified disk or in a specified directory.

Winchester disk An early IBM name for a hard disk. The term is derived from IBM's internal

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MMX \M-M-X\ *n.* Short for Multimedia Extensions. An enhancement to the architecture of Intel Pentium processors that improves the performance of multimedia and communications applications.

.mn \dot-M-N\ *n.* On the Internet, the major geographic domain specifying that an address is located in Mongolia.

mnemonic \nē-mon-ik\ *n.* A word, rhyme, or other memory aid used to associate a complex or lengthy set of information with something that is simple and easy to remember. Mnemonics are widely used in computing. Programming languages other than machine language, for example, are known as *symbolic languages* because they use short mnemonics, such as *ADD* (for *addition*) and *def* (for *define*) to represent instructions and operations. Similarly, operating systems and applications based on typed commands use mnemonics to represent instructions to the program. MS-DOS, for example, uses *dir* (for *directory*) to request a list of files.

MNP10 \M-N-P-ten\ *n.* Short for Microcom Networking Protocol, Class 10. An industry-standard communication protocol used for modem connections over analog cellular telephone connections. The most recent version of MNP10 is MNP 10EC (EC stands for Enhanced Cellular). *See also* communications protocol.

.mn.us \dot-M-N-dot-U-S\ *n.* On the Internet, the major geographic domain specifying that an address is located in Minnesota, United States.

.mo \dot-M-O\ *n.* On the Internet, the major geographic domain specifying that an address is located in Macau.

mobile computing \mō-bəl kəm-pyōō-tēng\ *n.* The process of using a computer while traveling. Mobile computing usually requires a portable computer that is battery powered, rather than a desktop system.

mode \mōd\ *n.* The operational state of a computer or a program. For example, edit mode is the state in which a program accepts changes to a file. *See also* address mode, compatibility mode, safe mode, video mode, virtual real mode.

modec \mō-dek\ *n.* In telecommunications, a device that generates analog modem signals digitally. The term *modec* is a combination of the terms *modem* and *codec*. *See also* codec (definition 1), modem.

model \mod-əl\ *n.* A mathematical or graphical representation of a real-world situation or object—for example, a mathematical model of the distribution of matter in the universe, a spreadsheet (numeric) model of business operations, or a graphical model of a molecule. Models can generally be changed or manipulated so that their creators can see how the real version might be affected by modifications or varying conditions. *See also* modeling, simulation.

modeling \mod-əl-ēng\ *n.* **1.** The use of computers to describe the behavior of a system. Spreadsheet programs, for example, can be used to manipulate financial data, representing the health and activity of a company; to develop business plans and projections; or to evaluate the impact of proposed changes on the company's operations and financial status. *See also* simulation, spreadsheet program. **2.** The use of computers to describe physical objects and the spatial relationships among them mathematically. CAD programs, for example, are used to create on-screen representations of such physical objects as tools, office buildings, complex molecules, and automobiles. These models use equations to create lines, curves, and other shapes and to place those shapes accurately in relation to each other and to the two-dimensional or three-dimensional space in which they are drawn. *See also* CAD, rendering, solid model, surface modeling, three-dimensional model, two-dimensional model, wire-frame model.

modem \mō-dəm\ *n.* Short for modulator/demodulator. A communications device that enables a computer to transmit information over a standard telephone line. Because a computer is digital (works with discrete electrical signals representing binary 1 and binary 0) and a telephone line is analog (carries a signal that can have any of a large number of variations), modems are needed to convert digital to analog and vice versa. When transmitting, modems impose (modulate) a computer's digital signals onto a continuous carrier frequency on the telephone line. When receiving, modems sift out (demodulate) the information from the carrier and transfer it in digital form to the

computer. Sophisticated modems are also capable of such functions as automatic dialing, answering, and redialing in addition to transmitting and receiving. Without appropriate communications software, however, modems cannot perform any useful work. *See also* baud rate.

modem bank \mō´dəm bank`\ *n.* A collection of modems connected to a server maintained by an ISP or the operator of a BBS or remote-access LAN. Most modem banks are configured to allow a remote user to dial a single phone number that routes calls to an available phone number on the bank. *See also* BBS (definition 1), ISP, LAN.

modem eliminator \mō`dəm i-lim´ə-nā-tər\ *n.* A device that enables two computers to communicate without modems. *See also* null modem.

modem port \mō´dəm pōrt`\ *n.* A serial port used for connecting an external modem to a personal computer. *See also* modem, serial port.

modem ready \mō`dəm red´ē\ *n. See* MR.

moderated \mod´ər-ā`təd\ *adj.* Subjected to review by a moderator, who may remove irrelevant or inflammatory articles or messages before redistributing them through a newsgroup, mailing list, or other messaging system.

moderated discussion \mod`ər-āt-əd di-skush´ən\ *n.* Communication taking place on a mailing list, newsgroup, or other online forum that is edited by a moderator. When one submits a message to a moderated discussion, the moderator decides if the message is relevant to the discussion topic. If so, it is forwarded to the discussion group. The content of a moderated discussion is often perceived as more valuable than that of an unmoderated one because the information has been read and approved by a "gatekeeper," who has (presumably) filtered out irrelevant submissions. Some moderators also filter submissions for obscene or pornographic material or material that is potentially offensive. *See also* mailing list, moderator, newsgroup.

moderator \mod´ər-ā`tər\ *n.* In some Internet newsgroups and mailing lists, a person through whom all messages are filtered before they are distributed to the members of the newsgroup or list. The moderator discards or edits any messages that are not considered appropriate. *See also* mailing list, newsgroup.

modified frequency modulation encoding \mod`ə-fīd frē`kwən-sē mo͝j`ə-lā´shən en-kō`dĕng, mo`dyə-lā´shən\ *n.* Abbreviated MFM encoding. A widely used method of storing data on disks. MFM encoding is based on an earlier technique called frequency modulation encoding but improves on its efficiency by reducing the need for synchronizing information and by basing the magnetic coding of each bit on the status of the previously recorded bit. MFM encoding stores more information on a disk than does frequency modulation encoding and is used on many hard disks. It is not, however, as efficient a space saver as the technique known as *run-length limited encoding*, or RLL. *Compare* frequency modulation encoding, run-length limited encoding.

modifier key \mod´ə-fī-ər kē`\ *n.* A key on the keyboard that, when held down while another key is pressed, changes the meaning of the keystroke. *See also* Alt key, Command key, Control key, Shift key.

modify structure \mod´ə-fī struk`chur\ *n.* An operator available in some database management systems that permits fields (columns) to be added or deleted without the need to rebuild the entire database.

MO disk \M-O´ disk`\ *n. See* magneto-optic disc.

MO disk drive \M-O` disk´ drīv\ *n. See* magneto-optic disc.

Modula-2 \mo͝j`ə-lə-tōō´, mo`dyə-lə-\ *n.* A modular high-level language designed in 1980 by Niklaus Wirth. Derived from Pascal, Modula-2 is noted for its emphasis on modular programming, its early support for data abstraction, and its lack of standard functions and procedures. *See also* modular programming.

modular design \mo͝j`ə-lər də-zīn´, mo`dyə-lər\ *n.* An approach to designing hardware or software. In modular design, a project is broken into smaller units, or modules, each of which can be developed, tested, and finished independently before being combined with the others in the final product. Each unit is designed to perform a particular task or function and can thus become part of a "library" of modules that can often be reused in other products having similar requirements. In programming, for example, one module might consist of instructions for moving the cursor in a

real-time \rēl´tīm\ *adj.* Of or relating to a time frame imposed by external constraints. Real-time operations are those in which the machine's activities match the human perception of time or those in which computer operations proceed at the same rate as a physical or external process. Real-time operations are characteristic of aircraft guidance systems, transaction-processing systems, scientific applications, and other areas in which a computer must respond to situations as they occur (for example, animating a graphic in a flight simulator or making corrections based on measurements).

real-time animation \rēl´-tīm an-ə-mā´shən\ *n.* Computer animation in which images are computed and updated on the screen at the same rate at which the objects simulated might move in the real world. Real-time animation allows dynamic involvement by the user because the computer can accept and incorporate keystrokes or controller movements as it is drawing the next image in the animation sequence. Arcade-style animation (such as in a flight simulator program) makes use of real-time animation in translating game plays into on-screen actions. In contrast, in animation done in virtual time, image frames are first calculated and stored and later replayed at a higher rate to achieve smoother movement. *See also* animation, bit block.

real-time clock \rēl´-tīm klok´\ *n.* *See* clock (definition 2).

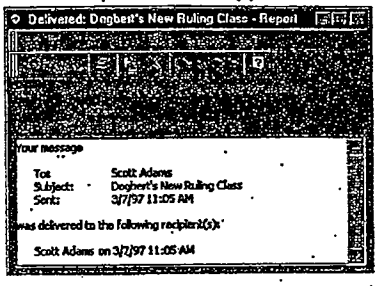
real-time conferencing \rēl´tīm kon´frən-sēng\ *n.* *See* teleconferencing.

real-time operating system \rēl´tīm op´ər-ā-tēng sis´təm\ *n.* An operating system designed or optimized for the needs of a process-control environment. *See also* real-time system.

real-time system \rēl´tīm sis´təm\ *n.* A computer and/or a software system that reacts to events before the events become obsolete. For example, airline collision avoidance systems must process radar input, detect a possible collision, and warn air traffic controllers or pilots while they still have time to react.

reboot \rē-bōōt´\ *vb.* To restart a computer by reloading the operating system. *See also* boot[2], cold boot, warm boot.

receipt notification \rə-sēt´ nō-tə-fə-kā´shən\ *n.* An e-mail feature providing feedback to the sender that a message has been received by the recipient. See the illustration.



Receipt notification.

receive \rə-sēv´\ *vb.* To accept data from an external communications system, such as a local area network (LAN) or a telephone line, and store the data as a file.

Receive Data \rə-sēv´ dā´tə, dat´ə\ *n.* *See* RXD.

rec. newsgroups \rek´dot-nōōz´ grōōps\ *n.* Usenet newsgroups that are part of the rec. hierarchy and whose names have the prefix "rec." These newsgroups cover topics devoted to discussions of recreational activities, hobbies, and the arts. *See also* newsgroup, traditional newsgroup hierarchy, Usenet. *Compare* comp. newsgroups, misc. newsgroups, news. newsgroups, sci. newsgroups, soc. newsgroups, talk. newsgroups.

recompile \rē´kəm-pīl´\ *vb.* To compile a program again, usually because of changes that needed to be made in the source code in response to error messages generated by the compiler. *See also* compile.

record[1] \rek´ərd\ *n.* A data structure that is a collection of fields (elements), each with its own name and type. Unlike an array, whose elements all represent the same type of information and are accessed using an index, the elements of a record represent different types of information and are accessed by name. A record can be accessed as a collective unit of elements, or the elements can be accessed individually. *See also* array, data structure, type[1] (definition 1).

record[2] \rə-kōrd´\ *vb.* To retain information, usually in a file.

record format \rek´ərd fōr´mat\ *n.* *See* record structure.

record head \rə-kōrd´ hed´\ *n.* The device in a tape machine that places data on the tape. In some

the user to select options, and scroll bars, which allow the user to move through a document or position text in a window.

control break \kən-trōl´ brāk`\ *n.* A transition in control of the computer that typically gives control of the central processing unit (CPU) to the user console or to some other program.

Control-Break \kən-trōl´brāk`\ *n. See* Break key.

control bus \kən-trōl´ bus`\ *n.* The set of lines (conductors) within a computer that carry control signals between the central processing unit (CPU) and other devices. For example, a control bus line is used to indicate whether the CPU is attempting to read from memory or to write to it; another control bus line is used by memory to request an interrupt in case of a memory error.

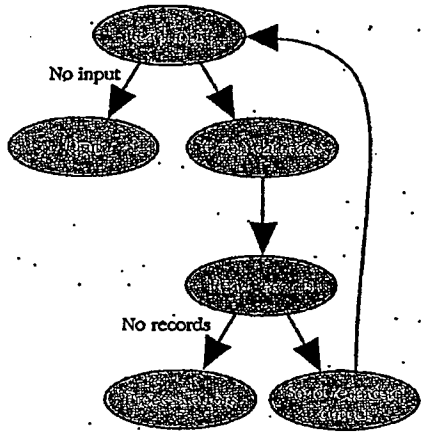
control character \kən-trōl´ kâr`ək-tər\ *n.* **1.** Any of the first 32 characters in the ASCII character set (0 through 31 in decimal representation), each of which is defined as having a standard control function, such as carriage return, linefeed, or backspace. **2.** Any of the 26 characters Control-A through Control-Z (1 through 26 in decimal representation) that can be typed at the keyboard by holding the Control key down and typing the appropriate letter. The six remaining characters with control functions, such as Escape (ASCII 27), cannot be typed using the Control key. *Compare* control code.

control code \kən-trōl´ kōd`\ *n.* One or more nonprinting characters used by a computer program to control the actions of a device, used in printing, communications, and management of display screens. Control codes are mainly employed by programmers or by users to control a printer when an application program does not support the printer or one of its specialized features. In video, control codes are sent from a computer to a display unit to manipulate the appearance of text or a cursor on the screen. Popular video control code sets are ANSI and VT-100. *Also called* escape sequence, setup string. *See also* control character.

control console \kən-trōl´ kon`sōl\ *n. See* console.

control data \kən-trōl´ dā`tə, dat`ə\ *n.* Data that consists of information about timing and switching, used to synchronize and route other data or to manage the operation of a device such as a bus or a port.

control flow \kən-trōl´ flō`\ *n.* The tracing of all possible execution paths in a program, often represented in the form of a diagram. See the illustration.



Control flow.

Control key \kən-trōl´ kē`\ *n.* A key that, when pressed in combination with another key, gives the other key an alternative meaning. In many application programs, Control (labeled CTRL or Ctrl on a PC keyboard) plus another key is used as a command for special functions. *See also* control character (definition 2).

controller \kən-trō`lər\ *n.* A device on which other devices rely for access to a computer subsystem. A disk controller, for example, controls access to one or more disk drives, managing physical and logical access to the drive or drives.

control logic \kən-trōl´ loj`ik\ *n.* The electronic circuitry that generates, interprets, and uses control data.

control panel \kən-trōl´ pan`əl\ *n.* In Windows and Macintosh systems, a utility that allows the user to control aspects of the operating system or hardware, such as system time and date, keyboard characteristics, and networking parameters.

control sequence \kən-trōl´ sē`kwens\ *n. See* control code.

density disks increased that capacity to 360 KB. Double-density disks use modified frequency modulation encoding for storing data. *See also* floppy disk, microfloppy disk, modified frequency modulation encoding. *Compare* high-density disk.

double-dereference \də`bl-dē-ref´ər-əns, -dē-ref´rəns\ *vb.* To dereference a pointer that is pointed to by another pointer; in other words, to access the information pointed to by a handle. *See also* dereference, handle (definition 1), pointer (definition 1).

double-precision \də`bl-prə-sizh`ən\ *adj.* Of, pertaining to, or characteristic of a number stored in twice the amount (two words—typically 8 bytes) of computer memory that is required for storing a less precise (single-precision) number. Double-precision numbers are commonly handled by a computer in floating-point form. *See also* floating-point number. *Compare* single-precision.

double-sided disk \də`bl-sī-dəd disk`\ *n.* A floppy disk that can hold data on both its top and bottom surfaces.

double-strike \də`bl-strīk`\ *n.* On an impact printer, such as a daisy-wheel printer, the process of printing twice over a word, producing text that appears darker and heavier, or bolder, than it normally appears. On dot-matrix printers, double striking with a slight offset can be used to fill in the space between the dots, producing smoother and darker characters.

double word \də`bl wərd´\ *n.* A unit of data consisting of two contiguous words (connected bytes, not text) that are handled together by a computer's microprocessor.

doubly linked list \də`blē lēnkd list´\ *n.* A series of nodes (items representing discrete segments of information) in which each node refers to both the next node and the preceding node. Because of these two-way references, a doubly linked list can be traversed both forward and backward, rather than in a forward direction only, as with a singly linked list.

down \doun\ *adj.* Not functioning, in reference to computers, printers, communications lines on networks, and other such hardware.

downlink \doun´lēnk\ *n.* The transmission of data from a communications satellite to an earth station.

download \doun´lōd\ *vb.* **1.** In communications, to transfer a copy of a file from a remote computer to the requesting computer by means of a modem or network. **2.** To send a block of data, such as a PostScript file, to a dependent device, such as a PostScript printer. *Compare* upload.

downloadable font \doun´lō-də-bl font`\ *n.* A set of characters stored on disk and sent (downloaded) to a printer's memory when needed for printing a document. Downloadable fonts are most commonly used with laser printers and other page printers, although many dot-matrix printers can accept some of them. *Also called* soft font.

downsizing \doun´sī`zēng\ *n.* In computing, the practice of moving from larger computer systems, such as mainframes and minicomputers, to smaller systems in an organization, generally to save costs and to update to newer software. The smaller systems are usually client/server systems composed of a combination of PCs, workstations, and some legacy system such as a mainframe, connected in one or more local area networks or wide area networks. *See also* client/server architecture, legacy system.

downstream \doun-strēm`\ *n.* The direction in which a news feed for a newsgroup is passed from one news server to the next. *See also* news feed, news server, newsgroup.

downtime \doun´tīm\ *n.* The amount or percentage of time a computer system or associated hardware remains nonfunctional. Although downtime can occur because hardware fails unexpectedly, it can also be a scheduled event, as when a network is shut down to allow time for maintenance.

downward compatibility \doun´wərd kəm-pat`ə-bil`ə-tē\ *n.* The capability of source code or programs developed on a more advanced system or compiler version to be executed or compiled by a less advanced (older) version. *Compare* upward-compatible.

DP \D-P`\ *n. See* data processing.

dpi \D`P-I`\ *n. See* dots per inch.

DPMA \D`P-M-A`\ *n.* Acronym for Data Processing Management Association. A trade organization of information systems (IS) professionals. DPMA was founded in 1951 as the National Machine Accountants Association.

DPMI \D`P-M-I`\ *n.* Acronym for DOS Protected Mode Interface. A software interface, originally

medium-scale integration \mē´dē-um-skāl in-tə-grā´shən\ *n.* The concentration of between 10 and 100 circuit elements on a single chip. *Acronym:* MSI (M´S-I´). *See also* integrated circuit.

meg \meg\ *n. See* megabyte.

mega- \meg´ə\ *prefix* Abbreviated M. One million (10^6). In computing, which is based on the binary (base-2) numbering system, *mega-* has a literal value of 1,048,576, which is the power of 2 (2^{20}) closest to one million.

megabit \meg´ə-bit´\ *n.* Abbreviated Mb or Mbit. Usually 1,048,576 bits (2^{20}); sometimes interpreted as 1 million bits.

megabyte \meg´ə-bīt´\ *n.* Abbreviated MB. Usually 1,048,576 bytes (2^{20}); sometimes interpreted as 1 million bytes.

megacycle \meg´ə-sī´kl\ *n.* Abbreviated MC. A term for 1 million cycles—usually used to mean 1 million cycles per second. *See also* megahertz.

megaflops \meg´ə-flops´\ *n. See* MFLOPS.

megahertz \meg´ə-hərts´\ *n.* Abbreviated MHz. A measure of frequency equivalent to 1 million cycles per second.

megapel display \meg´ə-pel di-splā´\ *n. See* megapixel display.

megapixel display \meg´ə-piks´əl di-splā´\ *n.* A video display capable of displaying at least 1 million pixels. For example, a video display with a screen size of 1,024 horizontal pixels and 1,024 vertical pixels is a megapixel display. *Also called* megapel display.

member \mem´bər\ *n.* **1.** In object-oriented programming, a variable or routine that is part of a class. *See also* C++, class. **2.** A value that is part of a set data structure. *See also* set[2] (definition 1).

membrane keyboard \mem´brān kē´bōrd\ *n.* A keyboard in which an unbroken plastic or rubber shell (a membrane) covers keys that have little or no travel (movement). Rather than using normal, full-travel keys, membrane keyboards use pressure-sensitive areas that are sometimes, but not always, defined by small bumps under the membrane.

memo field \mem´ō fēld´\ *n.* A field in a database file that can contain unstructured text.

memory \mem´ər-ē\ *n.* A device where information can be stored and retrieved. In the most general sense, memory can refer to external storage such as disk drives or tape drives; in common usage, it refers only to the fast semiconductor storage (RAM) directly connected to the processor. *See also* core, EEPROM, EPROM, flash memory, PROM, RAM, ROM. *Compare* bubble memory, mass storage.

memory bank \mem´ər-ē bank´\ *n.* The physical location on a motherboard where a memory module can be inserted. *See also* bank (definition 1).

memory cache \mem´ər-ē kash´\ *n. See* CPU cache.

memory card \mem´ər-ē kärd´\ *n.* A memory module that is used to extend RAM storage capacity or in place of a hard disk in a portable computer, such as a laptop, notebook, or handheld PC. The module is usually the size of a credit card and can be plugged into a PCMCIA-compliant portable computer. The module can be composed of EPROM, RAM, or ROM chips or flash memory. *Also called* RAM card, ROM card. *See also* EPROM, flash memory, handheld PC, hard disk, module (definition 2), PCMCIA, RAM, ROM.

memory cartridge \mem´ər-ē kär´trij\ *n.* A plug-in module containing RAM (random access memory) chips that can be used to store data or programs. Memory cartridges are used primarily in portable computers as smaller, lighter (but more expensive) substitutes for disk drives. Memory cartridges typically use either a nonvolatile form of RAM, which does not lose its contents when power is turned off, or battery-backed RAM, which maintains its contents by drawing current from a rechargeable battery within the cartridge. *Also called* RAM cartridge. *See also* memory card, RAM. *Compare* ROM cartridge.

memory cell \mem´ər-ē sel´\ *n.* An electronic circuit that stores one bit of data. *See also* bit.

memory chip \mem´ər-ē chip´\ *n.* An integrated circuit devoted to memory storage. The memory storage can be *volatile* and hold data temporarily, such as RAM, or *nonvolatile* and hold data permanently, such as ROM, EPROM, EEPROM, or PROM. *See also* EEPROM, EPROM, integrated circuit, nonvolatile memory, PROM, RAM, volatile memory.

memory management \mem´ər-ē man´əj-mənt\ *n.* **1.** In operating systems for personal computers, procedures for optimizing the use of RAM (random access memory). These procedures include

point operations. The result of the test is given in units called *whetstones*. The Whetstone benchmark has fallen out of favor because it produces inconsistent results compared with other benchmarks such as the Dhrystone and the sieve of Eratosthenes. *See also* benchmark[1], Dhrystone, sieve of Eratosthenes.

WHIRLWIND \hwərl´wind, wərl´wind\ *n.* A digital computer using vacuum tubes, developed at Massachusetts Institute of Technology in the 1940s and used during the 1950s. The innovations introduced with WHIRLWIND included CRT displays and real-time processing. WHIRLWIND project members included Kenneth H. Olsen, who later founded Digital Equipment Corporation in 1957. *See also* CRT, real-time, vacuum tube.

whiteboard \hwīt´bōrd, wīt´bōrd\ *n.* Software that allows multiple users across a network to work together on a document that is simultaneously displayed on all the users' screens, as though they are all gathered around a physical whiteboard.

white noise \hwīt noiz´, wīt\ *n.* Noise that contains components at all frequencies, at least within the frequency band of interest. It is called "white" by analogy to white light, which contains light at all the visible frequencies. In the audible spectrum, white noise is a hiss or a roar, such as that produced when a television set is tuned to a channel over which no station is broadcasting.

white pages \hwīt´ pā´jəz, wīt´\ *n. See* DIB (definition 2).

white paper \hwīt´ pā´pər, wīt´\ *n.* An informal paper stating a position or proposing a draft specification, usually on a technical topic. *See also* specification (definition 1).

whois \hōō-iz´\ *n.* 1. An Internet service, provided by some domains, that enables a user to find e-mail addresses and other information for users listed in a database at that domain. 2. A UNIX command to access the whois service. 3. A command that displays a list of all users logged onto a Novell network.

whois client \hōō´iz klī´ənt\ *n.* A program (such as the UNIX whois command) that enables a user to access databases of usernames, e-mail addresses, and other information. *See also* whois.

whois server \hōō´iz sər´vər\ *n.* Software that provides the usernames and e-mail addresses from a database (often listing people who have accounts at an Internet domain) to users who request the information using whois clients. *See also* whois.

Whole Earth 'Lectronic Link \hōl´ ərth´ lek-tron´ik lēnk´\ *n. See* WELL.

whole number \hōl´ num´bər\ *n.* A number without a fractional component—for example, 1 or 173; an integer.

Wide Area Information Server \wīd´ âr-ē-ə in-fər-mā´shən sər´vər\ *n. See* WAIS.

wide area network \wīd´ âr-ē-ə net´wərk\ *n.* A communications network that connects geographically separated areas. *Acronym:* WAN (W´A-N´, wan).

wideband transmission \wīd´band tranz-mish´-ən\ *n. See* broadband network.

Wide SCSI or Wide SCSI-2 \wīd´ skuz´ē, S-C-S-I´\ *n.* A form of the SCSI-2 interface that can transfer data 16 bits at a time at up to 20 megabytes per second. The Wide SCSI connector has 68 pins. *See also* SCSI, SCSI-2. *Compare* Fast SCSI, Fast/Wide SCSI.

widow \wid´ō\ *n.* A last line of a paragraph, shorter than a full line, appearing at the top of a page. A widow is considered visually undesirable on the printed page. *Compare* orphan.

wildcard character \wīld´kärd kâr´ak-tər\ *n.* A keyboard character that can be used to represent one or many characters. The asterisk (*), for example, typically represents one or more characters, and the question mark (?) typically represents a single character. Wildcard characters are often used in operating systems as a means of specifying more than one file by name.

Win32 \win´thər-tē-tōō´\ *n.* The application programming interface in Windows 95 and Windows NT that enables applications to use the 32-bit instructions available on 80386 and higher processors. Although Windows 95 and Windows NT support 16-bit 80x86 instructions as well, Win32 offers greatly improved performance. *See also* 16-bit machine, 32-bit machine, 80386DX, 8086, application programming interface, central processing unit, Win32s.