

wafer: A thin slice of semiconducting material, such as a silicon crystal, upon which microcircuits are constructed by diffusion and deposition of various materials. *Note:* Millions of individual circuit elements, constituting hundreds of microcircuits, may be constructed on a single wafer. The individual microcircuits are separated by scoring and breaking the wafer into individual chips (“dice”).



WAIS: *Acronym for Wide Area Information Servers.* A distributed text searching system that uses the protocol standard ANS Z39.50 to search index databases on remote computers. *Note 1:* WAIS libraries are most often found on the Internet. *Note 2:* WAIS allows users to discover and access information resources on the network without regard to their physical location. *Note 3:* WAIS software uses the client-server model.

WAN: *Acronym for wide area network.*

wander: Relative to jitter and swim, long-term random variations of the significant instants of a digital signal from their ideal positions. *Note 1:* Wander variations are those that occur over a period greater than 1 s (second). *Note 2:* Jitter, swim, wander, and drift have increasing periods of variation in that order.

warm boot: *Synonym warm restart (def. #2).*

warm restart: **1.** A sequence of operations that is performed to reset a previously running system, after an unintentional shutdown. *Synonym warm start.* **2.** In computer operations, the restarting of equipment, after a sudden shutdown, that allows reuse of previously retained initialized input data, retained programs, and retained output queues. *Note 1:* A warm restart may be needed after a program failure. *Note 2:* A warm start or restart cannot occur if initial data, programs, and files are not

retained after closedown. *Synonyms hot boot, warm boot.* [From Weik '89]

warm start: *Synonym warm restart (def. #2).*

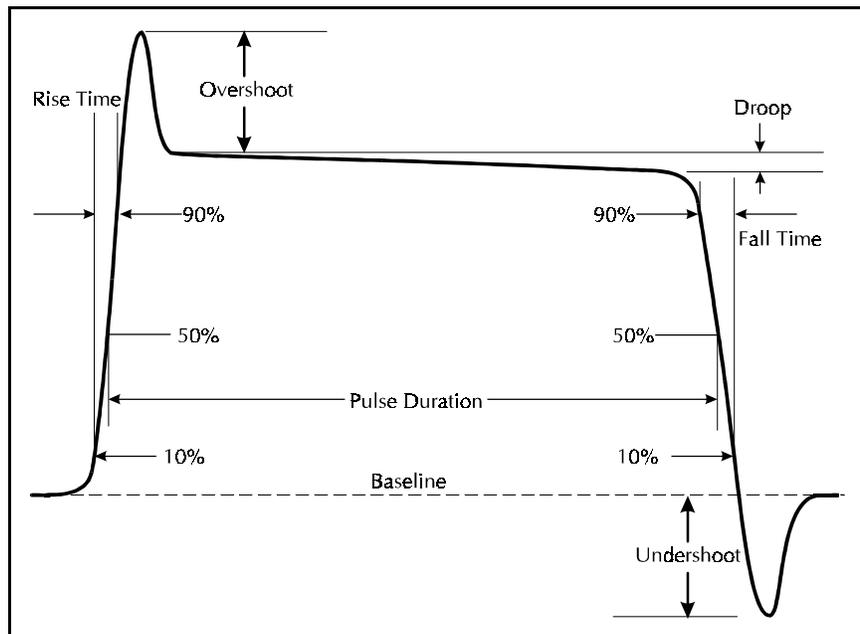
Warner exemption: A statutory exemption pertaining to the acquisition of telecommunications systems that meet the exclusionary criteria of the Warner Amendment, Public Law 97-86, 1 December 1981, which is also known as the Brooks Bill. (188) *Note:* Use of FTS2000 by U.S. Government agencies is mandatory when telecommunications are required. However, the Warner Amendment excludes the mandatory use of FTS2000 in instances related to maximum security.

WATS: *Acronym for Wide Area Telephone Service.*

wave equation: *See Maxwell's equations.*

waveform: The representation of a signal as a plot of amplitude versus time.

wavefront: The surface defined by the locus of points that have the same phase, *i.e.*, have the same path length from the source. [After 2196] *Note 1:* The wavefront is perpendicular to the ray that represents an electromagnetic wave. *Note 2:* The plane in



representative pulse waveform

which the electric and magnetic field vectors lie is tangential to the wavefront at every point. *Note 3:* The vector that represents the wavefront indicates the direction of propagation. *Note 4:* For parallel, *i.e.*, collimated, rays, the wavefront is plane. For rays diverging from a point, or converging toward a point, the wavefront is spherical. For rays with varying divergence or convergence, the wavefront has other shapes, such as ellipsoidal and paraboloidal, depending on the nature of the source.

waveguide: A material medium that confines and guides a propagating electromagnetic wave. (188) *Note 1:* In the microwave regime, a waveguide normally consists of a hollow metallic conductor, usually rectangular, elliptical, or circular in cross section. This type of waveguide may, under certain conditions, contain a solid or gaseous dielectric material. *Note 2:* In the optical regime, a waveguide used as a long transmission line consists of a solid dielectric filament (optical fiber), usually circular in cross section. In integrated optical circuits an optical waveguide may consist of a thin dielectric film. *Note 3:* In the rf regime, ionized layers of the stratosphere and refractive surfaces of the troposphere may also act as a waveguide.

waveguide dispersion: See **dispersion**.

waveguide scattering: Scattering (other than material scattering) that is attributable to variations of geometry and refractive index profile of an optical fiber.

wave impedance: At a point in an electromagnetic wave, the ratio of the electric field strength to the magnetic field strength. (188) *Note 1:* If the electric field strength is expressed in volts per meter and the magnetic field strength is expressed in ampere-turns per meter, the wave impedance will have the units of ohms. The wave impedance, Z , of an electromagnetic wave is given by

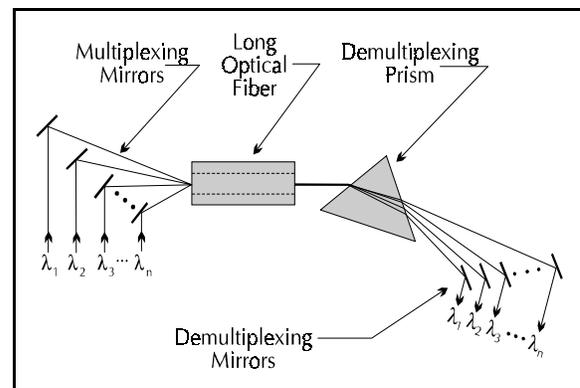
$$Z = \sqrt{\frac{\mu}{\epsilon}}$$

where μ is the magnetic permeability and ϵ is the electric permittivity. For free space, these values are $4\pi \times 10^{-7}$ H/m (henries per meter) and $(1/36\pi)$ F/m

(farads per meter), from which 120π , *i.e.*, 377, ohms is obtained. In dielectric materials, the wave impedance is $377/n$, where n is the refractive index. *Note 2:* Although the ratio is called the wave impedance, it is also the impedance of the free space or the material medium.

wavelength: The distance between points of corresponding phase of two consecutive cycles of a wave. (188) *Note:* The wavelength, λ , is related to the propagation velocity, v , and the frequency, f , by $\lambda = v/f$.

wavelength-division multiplexing (WDM): In optical fiber communications, any technique by which two or more optical signals having different wavelengths may be simultaneously transmitted in the same direction over one fiber, and then be separated by wavelength at the distant end. (188)



one kind of wavelength-division multiplexer

wavelength stability: Of an optical source during a specified period, the maximum deviation of the peak wavelength from its mean value.

wave trap: A device used to exclude unwanted frequency components, such as noise or other interference, of a wave. *Note:* Traps are usually tunable to permit selection of unwanted or interfering signals. [From Weik '89]

WDM: Abbreviation for **wavelength-division multiplexing**.

weakly guiding fiber: An optical fiber in which the refractive index contrast is small (substantially less than 1%).

web browser: A user interface (usually graphical) to hypertext information on the World Wide Web.

weighting network: A network having a loss that varies with frequency in a predetermined manner, and which network is used for improving or correcting transmission characteristics, or for characterizing noise measurements. (188)

whip antenna: A flexible rod antenna, usually between 1/10 and 5/8 wavelength long, supported on a base insulator.

white area: The area or population which does not receive interference-free primary service from an authorized AM station or does not receive a signal strength of at least 1 mV/m from an authorized FM station. [47CFR]

white facsimile transmission: **1.** In an amplitude-modulated facsimile system, transmission in which the maximum transmitted power corresponds to the minimum density, *i.e.*, the white area, of the object. (188) **2.** In a frequency-modulated facsimile system, transmission in which the lowest transmitted frequency corresponds to the minimum density *i.e.*, the white area, of the object. (188)

white noise: Noise having a frequency spectrum that is continuous and uniform over a specified frequency band. (188) *Note:* White noise has equal power per hertz over the specified frequency band. *Synonym additive white gaussian noise.*

white pages: **1.** A hard copy telephone directory listing of subscriber names, addresses, and telephone numbers. *Note:* *White pages* is associated with the residential subscriber listings in the standard directories distributed by the Bell System before divestiture. **2.** An electronic information database that contains user names and their associated network addresses, in the manner of a telephone directory. *Note:* Electronic white pages usually contain additional information, such as office location, phone number, and mailstop.

white signal: In facsimile systems, the signal resulting from scanning a minimum-density area, *i.e.*, the white area, of the object. (188)

who-are-you (WRU) character: A transmission-control character used for (a) switching on an answer-back unit in the station with which the connection has been established, (b) triggering the receiving unit to transmit an answer-back code to the terminal that transmitted the WRU signal, and (c) initiating a response that might include station identification, an indication of the type of equipment that is in service, and the status of the station. *Note 1:* The WRU signal corresponds to the 7-bit code assigned to the WRU. *Note 2:* The receiving unit may be a telegraph unit, data terminal equipment (DTE), or other unit. *Synonym WRU signal.* [From Weik '89]

Wide Area Information Servers (WAIS): *See WAIS.*

wide area network (WAN): A physical or logical network that provides data communications to a larger number of independent users than are usually served by a local area network (LAN) and is usually spread over a larger geographic area than that of a LAN. *Note 1:* WANs may include physical networks, such as Integrated Services Digital Networks (ISDNs), X.25 networks, and T1 networks. *Note 2:* A metropolitan area network (MAN) is a WAN that serves all the users in a metropolitan area. WANs may be nationwide or worldwide.

Wide Area Telephone Service (WATS): A toll service offering for customer dial-type telecommunications between a given customer [user] station and stations within specified geographic rate areas employing a single access line between the customer [user] location and the serving central office. Each access line may be arranged for either outward (OUT-WATS) or inward (IN-WATS) service, or both. [47CFR] *Note:* The offering is for fixed-rate inter- and intra-LATA services measured by zones and hours.

wideband: **1.** The property of any communications facility, equipment, channel, or system in which the range of frequencies used for transmission is greater than 0.1 % of the midband frequency. (188) *Note:* "Wideband" has many meanings depending upon application. "Wideband" is often used to distinguish it from "narrowband," where both terms are subjectively defined relative to the implied context. **2.** In communications security systems, a bandwidth

exceeding that of a nominal 4-kHz telephone channel. (188) [From Weik '89] **3.** The property of a circuit that has a bandwidth wider than normal for the type of circuit, frequency of operation, or type of modulation. **4.** In telephony, the property of a circuit that has a bandwidth greater than 4 kHz. (188) **5.** Pertaining to a signal that occupies a broad frequency spectrum. *Synonym* **broadband.** [From Weik '89]

wideband channel: A communication channel of a bandwidth equivalent to twelve or more voice-grade channels. [47CFR]

wideband modem: **1.** A modem whose modulated output signal can have an essential frequency spectrum that is broader than that which can be wholly contained within, and faithfully transmitted through, a voice channel with a nominal 4-kHz bandwidth. (188) **2.** A modem whose bandwidth capability is greater than that of a narrowband modem.

wildcard character: **1.** A character that may be substituted for any of a defined subset of all possible characters. *Note 1:* In high-frequency (HF) radio automatic link establishment, the wildcard character “?” may be substituted for any one of the 36 characters, “A” through “Z” and “0” through “9.” *Note 2:* Whether the wildcard character represents a single character or a string of characters must be specified. (188) **2.** In computer (software) technology, a character that can be used to substitute for any other character or characters in a string. *Note:* The asterisk (*) usually substitutes as a wildcard character for any one or more of the ASCII characters, and the question mark (?) usually substitutes as a wildcard character for any one ASCII character.

wild-point detection: *Synonym* **reasonableness check.**

WIN: *Abbreviation for WWMCCS Intercomputer Network.*

window: **1.** In fiber optics, a band of wavelengths at which an optical fiber is sufficiently transparent for practical use in communications applications. [After FAA] *Synonyms* **spectral window, transmission window.** *See* **first window, second window, third window.** **2.** In imagery, a portion of a display

surface in which display images pertaining to a particular application can be presented. *Note:* Different applications can be displayed simultaneously in different windows. **3.** A period during which an event can occur, can be expected to occur, or is allowed to occur.

windowing: Sectioning of a video display area into two or more separate regions for the purpose of displaying images from different sources. (188) *Note:* In windowing, one window could display data, another motion video from a remote site, and another, graphics.

wink: In telephone switching systems, a single supervisory pulse, *i.e.*, the momentary presence of, or interruption of, a supervisory signal. (188) *Note:* An example of a wink is the momentary flash of a supervisory light on an attendant’s switchboard.

wink pulsing: In telephone switching systems, recurring pulsing in which the off-condition is relatively short compared to the on-condition. *Note:* On key-operated telephone instruments, the hold position, *i.e.*, the hold condition, of a line is often indicated by wink pulsing the associated lamp at 120 pulses per minute. During 6% of the pulse period the lamp is off and 94% of the period the lamp is on, *i.e.*, 30 ms (milliseconds) off and 470 ms on. (188)

wired radio frequency systems: Systems employing restricted radiation devices in which the radio frequency energy is conducted or guided along wires or in cables, including electric power and telephone lines. [NTIA]

wireless access mode: In personal communications service, interfacing with a network access point by means of a standardized air interface protocol without the use of a hardwired connection to the network.

wireless mobility management: In Personal Communications Service (PCS), the assigning and controlling of wireless links for terminal network connections. *Note:* Wireless mobility management provides an “alerting” function for call completion to a wireless terminal, monitors wireless link performance to determine when an automatic link transfer is required, and coordinates link transfers between wireless access interfaces.

wireless terminal: Any mobile terminal, mobile station, personal station, or personal terminal using non-fixed access to the network.

wireline common carrier: Common carriers [that] are in the business of providing landline local exchange telephone service. [47CFR]

word: A character string or a bit string considered to be an entity for some purpose. (188) *Note:* In telegraph communications, six character intervals are defined as a word when computing traffic capacity in words per minute, which is computed by multiplying the data signaling rate in baud by 10 and dividing the resulting product by the number of unit intervals per character.

word length: The number of characters or bits in a word.

word processing: The use of a computer system to manipulate text. *Note:* Examples of word processing functions include entering, editing, rearranging, sorting, storing, retrieving, displaying, and printing text. *Synonym* **text processing**.

work space: In computers and data processing systems, the portion of main storage that is used by a computer program for the temporary storage of data.

work station: **1.** In automated systems, such as computer, communications, and control systems, the input, output, display, and processing equipment that provides the operator-system interface. **2.** A configuration of input, output, display, and processing equipment that constitutes a stand-alone system not requiring external access.

World Time: *Synonym* **Coordinated Universal Time**.

World Wide Web (WWW): An international, virtual-network-based information service composed of Internet host computers that provide on-line information in a specific hypertext format. *Note 1:* WWW servers provide hypertext metalanguage (HTML) formatted documents using the hypertext transfer protocol (HTTP). *Note 2:* Information on the WWW is accessed with a hypertext browser such as Mosaic, Viola, or Lynx. *Note 3:* No hierarchy exists

in the WWW, and the same information may be found by many different approaches.

worst hour of the year: That hour of the year during which the median noise over any radio path is at a maximum. (188) *Note:* This hour is considered to coincide with the hour during which the greatest transmission loss occurs.

W-profile fiber: *Synonym* **doubly clad fiber**.

wrapping: **1.** In a network using dual counter-rotating ring architecture, reconfiguration to circumvent a failed link or node. **2.** In open systems architecture, the use of a network to connect two other networks, thus providing an increased interaction capability between the two connected networks. *Note:* Recurring application of wrapping usually results in a hierarchical structure. [From Weik '89]

write: To make a permanent or transient recording of data in a storage device or on a data medium.

write cycle time: The minimum time interval between the starts of successive write cycles of a storage device that has separate reading and writing cycles.

write head: A magnetic head capable of writing only.

write protection label: *See* **write-protect tab**.

write-protect tab: A movable or removable tab, label, or other device, the presence or absence of which on the casing of a recording medium prevents writing on the medium. *Note:* An example of a write-protect tab is the sliding tab on a 3 1/2-inch (8.85-cm) magnetic diskette of the type used in conjunction with desktop computers.

WRU signal: *Synonym* **who-are-you (WRU) character**.

WWMCCS: *Abbreviation for* **Worldwide Military Command and Control System**.

(this page intentionally left blank)