

HARGRAVE'S COMMUNICATIONS DICTIONARY

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metering tone

tone is dependent on the cost per minute of the telephonic connection and can vary at various stages of a call (e.g., off-hook, dialing, ringing, or connected). See also *metering pulse*.

metric system A decimal system of weights and measures based on the meter (m) as a unit of length, the kilogram (kg) as a unit of mass, and the second (s) as the unit of time. Hence it is frequently referred to as the MKS (Meter Kilogram Second) system. The modern form of the *metric system* is the International System of Units (SI). See also *SI*.

metropolitan area network (MAN) A high-speed network with a maximum range of about 75 km (45 miles) or so. Most *MANs* include some type of telecommunications components and activity to handle long-distance transmissions.

Although *MANs* have many similarities with local area networks (LANs) and wide area networks (WANs), there are some differences, such as the following:

- *MANs* generally provide greater distances than LANs or campus area networks (CANs), but less than WANs; such as an entire metropolitan area (e.g., a large city and its suburbs).
- *MANs* generally include provisions for both voice and data transmissions.
- *MANs* generally involve higher speeds than either LANs or WANs, such as T3 (44+ Mbps) or fiber (600+ Mbps).
- *MANs* interconnect two or more LANs.

MANs often include several LANs connected to each other via telephone lines. Most *MAN* networks use one of two network architectures:

- Fiber Distributed Data Interface (FDDI), which supports transmission speeds of 100+ Mbps, uses a dual ring topology, and has optical fiber as the medium.
- Distributed Queue Dual Bus (DQDB), which is specified in IEEE 802.6. DQDB supports transmission speeds ranging to 600 Mbps over distances as large as 50 kilometers (30 miles). DQDB also uses a two-bus topology.

See also *IEEE 802.6*.

MF (1) An abbreviation of MultiFrequency. A signaling method used to set up connections between central offices. *MF* signals are frequency pairs similar to DTMF signals; the frequencies are different, however. See also *trunk multifrequency (MF) signaling*. **(2)** An abbreviation of Medium Frequency.

MFD (1) An abbreviation of Mode Field Diameter. **(2)** The units of capacitance MicroFaraD, although it is usually shown in lower case (mfd) or in the SI system as μF .

MFJ An abbreviation of Modified Final Judgment.

MFLOPS An abbreviation of Million (10^6) Floating point Operations Per Second.

MFM An abbreviation of Modified Frequency Modulation.

MFP An abbreviation of MultiFunction Peripheral.

MFS An abbreviation of Macintosh File System.

MFSK An abbreviation of M-ary Frequency Shift Key, Multi-level Frequency Shift Key, or Multiple Frequency Shift Key. See also *frequency shift key (FSK)* and *modulation*.

mho An obsolete term for the units of measure of *admittance* or *conductance*. Replaced by the SI unit *siemens (S)*.

MHS (1) An abbreviation of ITU-T's Message Handling System. **(2)** An abbreviation of Novell NetWare's Message Handling Service.

MHz An abbreviation of MegaHertz. Meaning 10^6 cycles per second.

MIB An abbreviation of Management Information Base.

micro (μ) (1) The SI prefix indicating one one-millionth (10^{-6}). **(2)** An abbreviation for MicroProcessor or MicroComputer.

microbend loss In an optical fiber, optical power loss caused by a microbend.

microbending Deviations of the axis (bending) which are small compared to the wavelength of the transmitted energy. Microbends can result from waveguide coating, cabling, packaging, and installation. Generally applied to optical waveguides. *Microbending* can cause high losses of transmitted energy (radiative loss) and mode coupling. See also *macro bend*.

MicroChannel[®] IBM's proprietary 32-bit computer communication bus architecture introduced in 1988 that offers improved performance over the Industry Standard Architecture (ISA) bus. It is used primarily by some of the PS/2 computers.

A *MicroChannel* environment allows software to set addresses and interrupts for hardware devices. This means that manual jumper or dipswitch on the boards is not necessary. Hence, it helps reduce the number of address and interrupt conflicts. *MicroChannel* was formerly known as MCA, but this name was dropped after the Music Corporation of America filed a lawsuit. See also *EISA*, *ISA*, *Peripheral Component Interconnect (PCI)*, and *VESA*.

microcircuit A synonym for *integrated circuit (IC)*.

microcode Very low-level software that is resident in ROM and embedded within a computer or microcomputer. It performs the sequence of operations necessary to accomplish the higher level machine language instructions, such as MOVE, ADD, and so on. Generally, several microcode instructions (*microinstruction*) are executed for each machine-level instruction in a non-RTSC (reduced instruction set computing) processor.

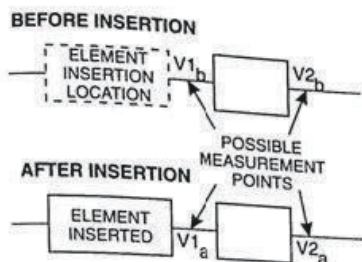
Microcom Networking Protocol (MNP) One of the de facto error-correction and data compression protocol suites used in data communications. Portions of the standard are incorporated into the ITU-T recommendations.

Since the original definition of the *MNP* protocol, nine enhancements (called classes) have been incorporated. Classes 1 through 4 have been placed in the public domain. Classes 2 through 4 (as well as the link access protocol for modems (LAP-M) protocol) are required elements of the ITU-T V.42 recommendation for modem error control. See also *MNP Class n*.

microcomputer (1) A computer built onto a single-silicon integrated circuit (chip). The microcomputer contains not only the central processing unit (CPU), but memory for program and data as well. **(2)** A computer (such as a PC or Macintosh) based on a single-chip microprocessor. It is less powerful than either a minicomputer or a mainframe computer.

microcontroller A microcomputer (or microprocessor) used to control some aspect(s) of a device or system. These mechanisms are found in toys, kitchen appliances, automobile ignition, pollution or airbag control systems, modems, or any of thousands of items in today's electronically controlled environment.

A *microcontroller* generally has a separate port for each sensory input (environmental or user) and control output, and has a program dedicated to a single function or set of functions. This program may not be modified by the user (although parameters of the program may sometimes be selectable). An example of a *microcontroller* is a "smart thermostat" to control temperature. The inputs may include:



Insertion loss is the ratio of the signal power delivered to a point in a system following a signal processing element *before* insertion of the signal processing element to the signal power delivered to the same point in the system *after* insertion of the signal processing element, that is,

$$L_i = 20 \cdot \log_{10} \left(\frac{V_{1b}}{V_{1a}} \right) = 20 \cdot \log_{10} \left(\frac{V_{2b}}{V_{2a}} \right)$$

inside dial tone A dial tone that users hear when they are connected to an intercom switch. Generally, the dial tone sounds different, either in frequency or cadence, from the public telephone network dial tone.

inside plant (1) That portion of a cable system that resides within buildings. **(2)** In telephony, everything inside the telephone company central office building.

inside wiring Wiring within a customer's premises that is used for internal communications or to connect customer premises equipment (CPE) to the network interface (the demarcation point).

in-situ Latin, meaning in place.

instantaneous frequency The rate of change of the angle of an angle-modulated wave with respect to time.

Institute of Electrical and Electronics Engineers (IEEE) See *IEEE*.

insulated conductor A conductor covered with any dielectric other than air having a rated insulating strength greater than the maximum voltage expected on the conductor.

insulating material class A system of rating insulating materials according to their temperature-withstanding capability. The class number is the minimum rated operating temperature. For example, Class 90 is rated for operation to 90°C, while Class 220 is rated for operation to 220°C.

MATERIAL CLASSES

Number	①	②	Typical Materials
90	A		Cotton, silk, or paper without impregnation.
105	B	A	Cotton, silk, paper, or enamel with coatings or impregnation.
130	C	B	Mica, silicon elastomer, or glass fiber with appropriate bonding materials.
155	D	F	Mica, silicon elastomer, or glass fiber with appropriate bonding materials.
180	E	H	Mica, silicon elastomer, or glass fiber with appropriate bonding materials.
200		N	
220	F	R	
>220	G		Mica, porcelain, glass, quartz, etc.
240		S	
>240		C	Mica, porcelain, glass, quartz, etc.

① Electric machine windings, electric cables.

② Used by random-wound ac electric machinery.

The letter designation is different depending on the application and agency specification.

Integrated Services Digital Network User Part (ISUP)

insulator Any material that is a very poor conductor of electricity, i.e., effectively does not conduct electricity in a specified application. Also called a *nonconductor*.

INT 14h The PC software interrupt used to re-route messages from the serial port to a modem or network interface card. This interrupt is used by communications programs.

integer A positive or negative whole number, i.e., a number without a fractional part. Examples include 1, 2, 100, and -32 766.

integral modem A modem that is built into a computer, as opposed to an internal modem that is installed after the computer is built. See also *external modem* and *internal modem*.

Integrated Database Application Programming Interface (IDAPI) A standard from Borland and others providing a standard interface to a wide range of databases. It is claimed to be a superset of Open Database Connectivity (ODBC).

integrated circuit (IC) An electronic circuit that consists of many individual interconnected circuit elements, such as transistors, diodes, resistors, capacitors, inductors, and other active and passive semiconductor devices, formed on a single piece of semiconductor material (called a die). This die is generally mounted on a substrate with leads for attachment to electronic assemblies. Also called a *chip* or *microcircuit*.

integrated digital access (IDA) The means of providing digital access for subscribers to the British Telecom (BT) ISDN service. Two versions are available: *single line IDA* and *multiline IDA*. Services available include data, video, and voice.

integrated digital network (IDN) A communication network that combines digital transmission and digital switching.

integrated numbering plan In telephony, within the world numbering plan, the means for identifying telephone stations inside a geographical area identified by a world-zone-number/country-code-number. See also *country code*.

integrated optical circuit (IOC) A circuit, or group of interconnected circuits, consisting of miniature solid-state optical components on either a semiconductor or dielectric substrate. *IOC* components include light sources (LED and ILD), optical filters, photodetectors, and thin-film optical waveguides.

integrated services digital network See *ISDN*.

Integrated Services Digital Network User Part (ISUP) The call control portion of the Signaling System 7 (SS7) protocol described in the ITU-T Q.761 and Q.764 recommendations. It determines the procedures for setting up, coordinating, and breaking down trunk calls on a SS7 network. Functions in *ISUP* include:

- Calling party number information (including privacy indicator),
- Call status checking (maintains the same trunk state and both trunk ends),
- Trunk management, and
- Application of appropriate tones and/or messages in the event of errors, blocking, or busy conditions.

Seven messages are associated with *ISUP*. They are listed here in the natural order of occurrence:

- Initial Address Message (IAM)
- Continuity Check Message (COT)
- Address Complete Message (ACM)
- Answer Message (ANM)
- Release Message (REL)
- Release Complete Message (RLC)
- Exit Message (EXM)