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GLOSSARY OF TERMS AND ABBREVIATIONS

The list contains terms found in this and other Motorola publications concerned with Motorola Semiconductor products for Communications.

A–Law — A European companding/encoding law commonly used in PCM systems.

A/B Signaling — A special case of 8th–bit (LSB) signaling in a μ–law system that allows four logic states to be multiplexed with voice on PCM channels.

A/D (analog–to–digital) converter (ADC) — A converter that uniquely represents all analog input values within a specified total input range by a limited number of digital output codes, each of them exclusively representing a fractional part of the total analog input range.

Aliasing Noise — A distortion component that is created when frequencies present in a sampled signal are greater than one–half the sample rate.

Answer Back — A signal sent by receiving data–processing device in response to a request from a transmitting device, indicating that the receiver is ready to accept or has received data.

Anti–Aliasing Filter — A filter (normally low pass) that band limits an input signal *before* sampling to prevent aliasing noise.

Asynchronous — A mode of data transmission in which the time occurrence of the bits within each character or block of characters relates to a fixed time frame, but the start of each character or block of characters is not related to this fixed time frame.

Attenuation — A decrease in magnitude of a communication signal.

Bandwidth — The information–carrying frequencies between the limiting frequencies of a communication line or channel.

Baseband — The frequency band occupied by information–bearing signals before combining with a carrier in the modulation process.

Baud — A unit of signaling speed equal to the number of discrete signal conditions or events per second. This refers to the physical symbols/second used within a transmission channel.

Bit Rate — The speed at which data bits are transmitted over a communication path, usually expressed in bits per second. A 9600 bps terminal is a 2400 baud system with 4 bits/baud.

Blocking — A condition in a switching system in which no paths or circuits are available to establish a connection to the called party even though it is not busy, resulting in a busy tone to the calling party.

BORS(C)HT — Battery, Overvoltage, Ringing, Supervision, (Codec), Hybrid, Test; the functions performed by a subscriber line card in a telephone exchange.

Broadband — A transmission facility whose bandwidth is greater than that available on voice–grade facilities. (Also called wide band.)

C Message — A frequency weighting that evaluates the effects of noise based on its annoyance to the “typical” subscriber of standard telephone service or the effects of noise (background and impulse) on voice–grade data service.

Carrier — An analog signal of fixed amplitude and frequency that combines with an information–bearing signal by modulation to produce an output signal suitable for transmission.

CCITT — Consultative Committee for International Telephone and Telegraph; an international standards group of European International Telecommunications Union.

CCSN — Common Channel Signaling Network.

Central Office (CO) — A main telephone office, usually within a few miles of a subscriber, that houses switching gear; commonly capable of handling about 10,000 subscribers.

Channel Bank — Communication equipment commonly used for multiplexing voice–grade channels into a digital transmission signal (typically 24 channels in the U.S. and 30 channels in Europe).

CIDCW — Calling Identity Delivery on Call Waiting; a subscriber feature which allows for the display of the time, date, number, and possible other information about the caller to the called party while the called party is off–hook.

CLASS — Custom Local Area Signaling Service; a set of services, enhancements, provided to TELCO customers which may include CND, CNAM, Message Waiting, and other features.

CLID — Calling Line IDentification; a subscriber feature which allows for the display of the time, date, number, and possible other information about the caller to the called party.

CNAM — Calling Name Delivery; a subscriber feature which allows for the display of the time, date, number, and name of the caller to the called party.

CND — Calling Number Delivery; a subscriber feature which allows for the display of the time, date, number, and possible other information about the caller to the called party.

CODEC — COder–DECoder; the A/D and D/A function on a subscriber line card in a telephone exchange.

COFIDEC — COder–Filter–DECoder; the combination of a codec, the associated filtering, and voltage references required to code and decode voice in a subscriber line card.

Common Mode Rejection — The ability of a device having a balanced input to reject a voltage applied simultaneously to both differential–input terminals.

Companding — The process in which dynamic range compression of a signal is followed by expansion in accordance with a given transfer characteristic (companding law) which is usually logarithmic.

Compander — A combination of a compressor at one point in a communication path for reducing the amplitude range of signals, followed by an expander at another point for restoring the original amplitude range, usually to improve the signal–to–noise ratio.

Conference Call — A call between three or more stations, in which each station can carry on a conversation simultaneously.

CPE — Customer Premise Equipment; this could be a POTS phone, answering machine, fax machine, or any number of other devices connected to the PSTN.

Crosspoint — The operating contacts or other low–impedance–path connection over which conversations can be routed.

Crosstalk — The undesired transfer of energy from one signal path to another.

CSN — Circuit Switched Network.

CTS — Clear to send; a control signal between a modem and a controller used to initiate data transmission over a communication line.

CVSD — Continuous Variable Slope Delta (modulation); a simple technique to converting an analog signal (like voice) into a serial bit stream.

D3 — D3 channel bank; a specific generation of AT&T 24–channel PCM terminal that multiplexes 24 voice channels into a 1.544 MHz digital bit stream. The specifications associated with D3 channel banks are the basis for all PCM device specifications.

D/A (digital–to–analog) converter (DAC) — A converter that represents a limited number of different digital input codes by a corresponding number of discrete analog output values.

Data Compression — A technique that provides for the transmission of fewer data bits than originally required without information loss. The receiving location expands the received data bits into the original bit sequence.

dB (decibel) — A power or voltage measurement unit, referred to another power or voltage. It is generally computed as:

10 x log (P1/P2) for power measurements, and

20 x log (V1/V2) for voltage measurements.

dBm — An indication of signal power. 1.0 mW across 600 Ω, or 0.775 volts rms, is defined as 0 dBm. Any other voltage level is converted to dBm by:

dBm = 20 x log (Vrms/0.775), or

dBm = [20 x log (Vrms)] + 2.22.

dBmO — Signal power measured at a point in a standard test tone level at the same point.

i.e., dBmO = dBm = dBr

where dBr is the relative transmission level, or level relative to the point in the system defined as the zero transmission level point.

dBmOp — Relative power expressed in dBmp. (See dBmO and dBmp.)

dBmp — Indicates dBm measurement made with a psophometric weighting filter.

dBrn — Relative signal level expressed in decibels above reference noise, where reference noise is 1 pW. Hence, 0 dBrn = 1 pW = – 90 dBm.

dBrnC — Indicates dBrn measurement made with a C–message weighting filter. (These units are most commonly used in the U.S., where psophometric weighting is rarely used.)

dBrnc0 — Noise measured in dBrnc referenced to zero transmission level.

Decoding — A process in which one of a set of reconstructed analog samples is generated from the digital character signal representing a sample.

Delay Distortion — Distortion that occurs on communication lines due to the different propagation speeds of signals at different frequencies, measured in microseconds of delay relative to the delay at 1700 Hz. (This type of distortion does not affect voice communication, but can seriously impair data transmission.)

Delta Modulation — A simple digital coding technique that produces a serial bit stream corresponding to changes in analog input levels; usually utilized in devices employing continuously variable–slope delta (CVSD) modulation.

Demodulator — A functional section of a modem that converts received analog line signals to digital form.

DN — Directory Number.

Digital Telephone — A telephone terminal that digitizes a voice signal for transmission and decodes a received digital signal back to a voice signal. (It will usually multiplex 64 kbps voice and separate data inputs at multiples of 8 kbps.)

Distortion — The failure to reproduce an original signal's amplitude, phase, delay, etc. characteristics accurately.

DPSK — Differential Phase Shift Keying; a modulation technique for transmission where the frequency remains constant but phase changes will occur from 90°, 180°, and 290° to define the digital information.

DTMF — Dual Tone Multi–Frequency. It is the "tone dialing" system based on outputting two non–harmonic related frequencies simultaneously to identify the number dialed. Eight frequencies have been assigned to the four rows and four columns of a typical keypad.

Duplex — A mode of operation permitting the simultaneously two–way independent transmission of telegraph or data signals.

Echo — A signal that has been reflected or returned as a result of impedance mismatches, hybrid unbalance, or time delay. Depending upon the location of impedance irregularities and the propagation characteristics of a facility, echo may interfere with the speaker/listener or both.

Echo Suppressor — A device used to minimize the effect of echo by blocking the echo return currents; typically a voice–operated gate that allows communication one way at a time.

Encoder (PCM) — A device that performs repeated sampling, compression, and A/D conversion to change an analog signal to a serial stream of PCM samples representing the analog signal.

Equalizer — An electrical network in which phase delay or gain varies with frequency to compensate for an undesired amplitude or phase characteristic in a frequency–dependent transmission line.

ET — Exchange Termination (C.O. Switch).

FDM — Frequency–Division Multiplex; a process that permits the transmission of two or more signals over a common path by using a different frequency band for each signal.

Four Wire Circuit — The portion of a telephone, or central office, that operates on two pairs of wires. One pair is for the transmit path (generally from the microphone), and one pair is for the receive path (generally from the receiver).

Frame — A set of consecutive digit timeslots in which the position of each digit slot can be identified by reference to a frame alignment. The frame alignment signal does not necessarily occur, in whole or in part, in each frame.

Full Duplex — A mode of operation permitting simultaneous transmission of information between two locations in both directions.

Gain — The change in signal amplitude (increase or decrease) after passing through an amplifier, or other circuit stage. Usually expressed in dB, an increase is a positive number, and a decrease is a negative number.

Gain Tracking Error — The variation of gain from a constant level (determined at 0 dBm input level) when measuring the dependence of gain on signal level by comparing the output signal to the input signal over a range of input signals.

HDLC — High–Level Data Link Control; a CCITT standard data communication line protocol.

Half Duplex — A transmission system that permits communication in one direction at a time. CB ratios, with “push–to–talk” switches, and voice–activated speakerphones, are half duplex.

Handset — A rigid assembly providing both telephone transmitter and receiver in a form convenient for holding simultaneously to mouth and ear.

Hookswitch — A switch that connects the telephone circuit to the subscriber loop. The name derives from old telephones where the switch was activated by lifting the receiver off and onto a hook on the side of the phone.

Idle Channel Noise (ICN) — The total signal energy measured at the output of a device or channel under test when the input of the device or channel is grounded (often a wide–band noise measurement using a C–message weighting filter to band–limit the output noise).

Intermodulation — The modulation of the components of a complex wave by each other (in a nonlinear system).

Intermodulation Distortion — An analog line impairment when two frequencies interact to create an erroneous frequency, in turn distorting the data signal representation.

IRED — Infrared. Used as a wireless link for remote control or to transfer data.

ISDN — Integrated Services Digital Network; a communication network intended to carry digitized voice and data multiplexed onto the public network.

Jitter — A type of analog communication line distortion caused by abrupt, spurious signal variation from a reference timing position, and capable of causing data transmission errors, particularly at high speeds. (The variation can be in amplitude, time, frequency, or phase.)

Key System — A miniature PABX that accepts 4 to 10 lines and can direct them to as many as 30 telsets.

Mu–Law — (μ–law) A companding law accepted as the North American standard for PCM based systems.

LAN — Local Area Network; a data–only communication network between data terminals using a standard interface to the network.

Line — The portion of a circuit external to an apparatus that consists of the conductors connecting the apparatus to the exchange or connecting two exchanges.

Line Length Compensation — Also referred to as loop length compensation, it involves changing the gain of the transmit and receive paths, within a telephone, to compensate for different signal levels at the end of different line lengths. A short line (close to the CO) will attenuate signals less, and therefore less gain is needed. Compensation circuits generally use the loop current as an indication of the line length.

Longitudinal Balance — The common–mode rejection of a telephone circuit.

Loop — The loop formed by the two subscriber wires (Tip and Ring) connected to the telephone at one end, and the central office (or PBX) at the other end. Generally it is a floating system, not referred to ground, or ac power.

Loopback — Directing signals back toward the source at some point along a communication path.

Loop Current — The dc current that flows through the subscriber loop. It is typically provided by the central office or PBX, and ranges from 20 to 120 mA.

LT — Line Termination (Line Card).

MCU — MicroComputer Unit (also MicroController Unit).

MPU — MicroProcessor Unit.

Mu–Law — A companding/encoding law commonly used in U.S. (same as μ–law).

MUX — Multiplex or multiplexer.

Modem — MOdulator–DEModulator; a unit that modulates and demodulates digital information from a terminal or computer port to an analog carrier signal for passage over an analog line.

Multiplex — To simultaneously transmit two or more messages on a single channel.

NT1 — Network Termination 1 (OSI Layer 1 Only).

NT2 — Network Termination 2 (OSI Layers 2 and 3).

Off–Hook — The condition when the telephone is connected to the phone system, permitting loop current to flow. The central office detects the dc current as an indication that the phone is busy.

On–Hook — The condition when the telephone's dc path is open, and no dc loop current flows. The central office regards an on–hook phone as available for ringing.

PABX — Private Automatic Branch Exchange; a customer–owned, switchable telephone system providing internal and/or external station–to–station dialing.

Pair — The two associated conductors that form part of a communication channel.

Pass–Band Filter — A filter used in communication systems that allows only the frequencies within a communication channel to pass, and rejects all frequencies outside the channel.

PBX — Private Branch Exchange; a class of service in standard Bell System terminology that typically provides the same service as PABX.

PCM — Pulse Code Modulation; a method of transmitting data in which signals are sampled and converted to digital words that are then transmitted serially, typically as 8–bit words.

Phase Jitter — Abrupt, spurious variations in an analog line, generally caused by power and communication equipment along the line that shifts the signal phase relationship back and forth.

PLL — Phase–Locked Loop.

PLL Frequency Synthesizer — Phase–locked loop frequency synthesizer. A frequency synthesizer utilizing a closed loop, as opposed to DDS (direct digital synthesis) which is not a closed loop.

POTS — Plain Old Telephone Service.

Propagation Delay — The time interval between specified reference points on the input and output voltage waveforms.

Psophometric Weighting — A frequency weighting similar to C–Message weighting that is used as the standard for European telephone system testing.

PSN — Packet Switched Network.

PSTN — Public Switched Telephone Network.

Pulse Dialer — A device that generates pulse trains corresponding to digits or characters used in impulse or loop–disconnect dialing.

Quantizing Noise — Signal–correlated noise generally associated with the quantizing error introduced by A/D and D/A conversions in digital transmission systems.

REN — Ringer Equivalence Number; an indication of the impedance, or loading factor, of a telephone bell or ringer circuit. An REN of 1.0 equals about 8 kΩ. The Bell system typically permits a maximum of 5.0 REN (1.6 kΩ) on an individual subscriber line. A minimum REN of 0.2 (40 kΩ) is required by the Bell system.

Repeater — An amplifier and associated equipment used in a telephone circuit to process a signal and retransmit it.

Repertory Dialer — A dialer that stores a repertory of telephone numbers and dials any one of them automatically on request.

Ring — One of the two wires connecting the central office to a telephone. The name derives from the ring portion of the plugs used by operators (in older equipment) to make the connection. Ring is traditionally negative with respect to Tip.

RTS — Request To Send; an EIA–232 control signal between a modem and user's digital equipment that initiates the data transmission sequence on a communication line.

Sampling Rate — The frequency at which the amplitude of an analog signal is gated into a coder circuit. The Nyquist sampling theorem states that if a band–limited signal is sampled at regular intervals and at a rate equal to or greater than twice the highest frequency of interest, the sample contains all the information of the original signal. The frequency band of interest in telephony ranges from 300 to 3400 Hz, so a sampling rate of 8 kHz provides dc to 4000 Hz reproduction.

SCU — Subscriber Channel Unit; the circuitry at a telephone exchange associated with an individual subscriber line or channel.

Sidetone — The sound fed back to the receiver as a result of speaking into the microphone. It is a natural consequence of the 2–to–4 wire conversion system. Sidetone was recognized by Alexander Graham Bell as necessary for a person to be able to speak properly while using a handset.

Signaling — The transmission of control or status information between switching systems in the form of dedicated bits or channels of information inserted on trunks with voice data.

Signal–to–Distortion Ratio (S/D) — The ratio of the input signal level to the level of all components that are present when the input signal (usually a 1.020 kHz sinusoid) is eliminated from the output signal (e.g., by filtering).

SLIC — Subscriber Line Interface Circuit; a circuit that performs the 2–to–4 wire conversion, battery feed, line supervision, and common mode rejection at the central office (or PBX) end of the telephone line.

SOG Package — Small–Outline Gull–wing package; formerly SOIC with gull–wing leads. This package has leads which fold out from the body.

SOJ Package — Small–Outline J–lead package; formerly SOIC with J leads. This package has leads which are tucked under the body.

Speech Network — A circuit that provides 2–to–4 wire conversion, i.e., connects the microphone and receiver (or the transmit and receive paths) to the Tip and Ring phone lines. Additionally it provides sidetone control, and in many cases, the dc loop current interface.

Subscriber Line — The system consisting of the user's telephone, the interconnecting wires, and the central office equipment dedicated to that subscriber (also referred to as a loop).

Switchhook — A synonym for hookswitch.

Syn (Sync) — (1) A bit character used to synchronize a time frame in a time–division multiplexer. (2) A sequence used by a synchronous modem to perform bit synchronization or by a line controller for character synchronization.

Synchronous Modem — A modem that uses a derived clocking signal to perform bit synchronization with incoming data.

T1 Carrier — A PCM system operating at 1.544 MHz and carrying 24 individual voice–frequency channels.

TA — Terminal Adapter.

Talkdown — Missed signals in the presence of speech. Commonly used to describe the performance of a DTMF receiver when it fails to recognize a valid DTMF tone due to cancellation of that tone by speech.

Talkoff — False detections caused by speech. Commonly used to describe the performance of a DTMF receiver when speech, emulating DTMF, causes the receiver to believe it has detected a valid DTMF tone.

Tandem Trunk — See trunk.

Telephone Exchange — A switching center for interconnecting the lines that service a specific area.

TE1 — Terminal Equipment 1 (ISDN Terminal).

TE2 — Terminal Equipment 2 (Non–ISDN Terminal).

TELETEX — A text communication service between entirely electronic work stations that will gradually replace TELEX with the introduction of the digital network. (Not to be confused with teletext.)

TELETEXT — The name usually used for broadcast text (and graphics) for domestic television reception. (Not to be confused with teletex.)

Time–Division Multiplex — A process that permits the transmission of two or more signals over a common path by using a different time interval for each signal.

Tin Cans and String — A *crude* analog communications system commonly used to introduce voice communications to children.

Tip — One of the two wires connecting the central office to a telephone. The name derives from the tip of the plugs used by operators (in older equipment) to make the connection. Tip is traditionally positive with respect to ring.

Tone Ringer — The modern solid state equivalent of the old electromechanical bell. It provides the sound when the central office alerts the subscriber that someone is calling. Ringing voltage is typically 80–90 volts rms, 20 Hz.

Trunk — A telephone circuit or channel between two central offices or switching entities.

TSAC — Timeslot Assigner Circuit; a circuit that determines when a CODEC will put its 8 bits of data on a PCM bit stream.

TSIC — Timeslot Interchange Circuit; a device that switches digital highways in PCM based switching systems; a "digital" cross-point switch.

Twist — The amplitude ratio of a pair of DTMF tones. (Because of transmission and equipment variations, a pair of tones that originated equal in amplitude may arrive with a considerable difference in amplitude.)

Two Wire Circuit — Refers to the two wires connecting the central office to the subscriber's telephone. Commonly referred to as Tip and Ring, the two wires carry both transmit and receive signals in a differential manner.

UDLT — Universal Digital Loop Transceiver; a Motorola originated name for a voice/data transceiver circuit.

VCO — Voltage–controlled oscillator. Input is a voltage; output is a sinusoidal waveform.

VCM — Voltage–controlled multivibrator. Input is a voltage; output is a square wave.

Voice Frequency — A frequency within that part of the audio range that is used for the transmission of speech of commercial quality (i.e., 300–3400 Hz).

Weighting Network — A network whose loss varies with frequency in a predetermined manner.