

Exhibit SLM-2

Glossary of
Power Terms

Power Glossary

The terms defined in this glossary are, in most cases, electrical engineering terms and are defined within that context as well as within the specific context of telecommunications - 48Volt DC Battery Plant engineering practices.

-48 VDC: refers to 48 volts of direct current, which is the voltage required to power most telecommunications equipment.

A/B Distribution: refers to the redundancy built into DC power distribution systems. From the primary distribution system, most power systems rely on two (2) power feeder cables to prevent loss of power for call processing, which are independently protected for power surges or over-current situations. The primary power distribution cable is referred to as the “A” lead and the redundant power cable is referred to as the “B” lead. If the primary “A” lead should fail, the redundant “B” lead should provide uninterruptible power (and vice versa). Each of the two leads (and associated over-current protection) is engineered to provide the total power requirements of the load.ⁱ

Alternating Current (AC): an electrical current that alternates between positive and negative charged values at regular intervals.ⁱⁱ In North America, this is typically delivered by the local power utility to your home at 120 voltsⁱⁱⁱ.

Ampere or Amp: the measure of the unit quantity of electricity (electrons) moving through an electric circuit in a period of time. An ampere is equal to 6.28×10^{18} electrons (one coulomb) moving past a point in an electrical circuit in a given period of time. One ampere equals one coulomb of electrical energy past a point in one second.^{iv}

Ampere-Hour: the capacity rating of a storage batteries’ capability to deliver a quantity of electrical current, delivered by one ampere flowing for one or more hours.^v

Battery: a device providing a source of backup, filtered -48VDC current to telecommunications central office equipment.^{vi} Batteries transform chemical energy into electrical energy, and then discharge the electrical energy as electric current. Also referred to as a “cell.” Cells are known as galvanic or voltaic cell, and in their simplest form, consist of a piece of carbon and zinc suspended in a container with a sulfuric acid solution.^{vii}

Battery Capacity: the energy stored in a battery expressed in ampere-hours. In the telecommunications industry, a typical reference to battery capacity would be expressed in amperes (Amps) for a period of time, usually in hours. See, “Ampere Hour.”

Battery Charger: a rectifier used for transforming alternating current into direct current for charging a battery.

Battery Lead: refers to the lead extending from the power plant to the load (or equipment) which, in concert with the ground return and load, comprises the battery circuit. See also, “ground return” and “load”.

Battery Discharge: the release of current from a fully-charged battery.

Battery Distribution Board (BDB): DC power plant bays and panels used for distribution of -48VDC to telecommunications equipment or BDFB. The BDB panels consist of discharge fuses, circuit breakers, and switch and fuse units.

Battery Distribution Fuse Bay/Board (BDFB): equipment frames fed by large copper cables from the power board, which are equipped with fuses or circuit breakers that protect power distribution cables and telecommunications equipment from over-current and allow power to be distributed to equipment via smaller, less expensive distribution cables.

Battery Plant: an identifiable group of power equipment consisting of batteries, rectifiers, controllers and distribution bays.

Battery Stand: a racking structure made from metal or other material capable of supporting telecommunications batteries for the purpose of constructing and maintaining a DC power plant.

Bay: a telephone industry term for the space between the vertical panels or mounting strips (or rails) of the rack. One rack may contain several bays. A bay is another place you put equipment.

Bus Bar: copper or aluminum flat bars sized to carry high amperage loads, which are used to connect AC generators, AC feeders, batteries, rectifiers and other high current devices within a power plant.

Busy-Hour: a consecutive 60-minute interval that represents the highest levels of measurement or derived load used in traffic and power engineering within a telephone central office.^{viii}

Busy-Hour Drain: the amount of current required by telecommunications equipment over a period of time, usually one hour, at peak usage. See also, “Busy-Hour.”

Cable: in the context of power engineering, a cable refers to an insulated copper or aluminum conductor used to carry AC or DC power from one point to another.^{ix} In other telecommunications applications, “cable” refers to fiber or copper wires consisting of pairs or groups capable of carrying voice, data, video, etc.^x

Cable Rack: a metal frame used for overhead support of electrical cables. Also referred to as a ladder rack due to the resemblance to a ladder.

Central Office: a building that houses telecommunications switching, transmission and other telecommunications service-bearing equipment. The central office connects subscribers to telecommunications equipment and provides for connections to other subscribers by using devices such as switches, cables and next generation network elements.^{xi}

Circuit: the complete path of an electrical current.^{xii}

Circuit Breaker: a device that is utilized to “break” and restore a power circuit. Circuit breakers open (or break) a circuit when a predetermined voltage or current level is exceeded.

Circular Mil (CM): the measure of cross sectional area of a wire.

Collocation: a physical location where a CLEC locates its telecommunications equipment within an ILEC central office, which serves as the point at which the telephone companies hand-off telecommunications traffic to each other. The CLEC can construct a cage within the ILEC central office in which to house and maintain its equipment (physical collocation) or it can install equipment outside of a cage and allow the ILEC to maintain the equipment (virtual collocation). Adjacent collocation is also available.^{xiii}

Commercial AC Power: utility-provided alternating current.

Conductivity: the ability of a conductor’s substance or material to carry an electric current. This is the opposite of resistance. See, “resistance.”

Controller: A device controlling the function of electrical machines or devices connected to it. -48VDC power plants use controllers to manage the performance of rectifiers supplying DC current.

Coulomb: the quantity of electricity transferred by a current of one ampere in one second. One unit of quantity in measuring electricity.^{xiv}

Current: a measure of how much electricity passes a point on a wire in a given timeframe. Current is measured in amperes, or amps.^{xv}

DC Current: current that is induced by a voltage source that does not change direction from positive to negative.^{xvi}

DC Power Distribution: power equipment that is used as the primary distribution point from a DC power plant to telecommunications equipment.

DC Power Plant: power equipment that converts AC power to DC power and distributes DC power to DC power distribution equipment.

Digital Subscriber Line (DSL): a family of technologies that provide digital data transmission over the wires used in the "last mile" of a local telephone network. The download/upload speed of DSL varies depending on DSL technology and service level implemented.

Digital Subscriber Line Access Multiplexer (DSLAM): a piece of telecommunications equipment that receives signals from multiple customer Digital Subscriber Line (xDSL) connections and aggregates the signals on a high-speed backbone using multiplexing techniques, and with the use of splitters, allows voice (low band) and data (high band) signals to be carried over a copper twisted pair.

Feeder: cables providing current to all of the branch circuits from the main supply of current.

Fuse: an electrical device typically consisting of a wire or strip of fusible metal that melts to interrupt an electrical circuit when current exceeds the rated level of the fuse. The idea is that in any electrical circuit, the fuse should be the weakest point – thus the point that heats up when things go wrong and melts. See also “circuit breaker.”^{xvii}

Fuse Panel: a distribution panel at the top of the rack that serves each device. To protect the rectifier from an over-current condition, each device has its own fuse.^{xviii}

Ground Return: the path of a circuit from the load to the positive ground return of the DC power plant, which in concert with the battery lead and load, comprises the battery circuit. See also, “load” and “battery lead.”

HVAC: denotes heating, ventilation and air conditioning systems.

List 1 Drain: the average busy-hour current during normal plant operation (i.e. at float voltage). The value is used to size DC power plant equipment such as batteries and rectifiers.

List 2 Drain: the peak current under worst case conditions of voltage, traffic etc. This current is used to size DC power distribution equipment such as load feeder cables, plant discharge capacity and over-current protectors.

List 3 Drain: the summation of the simultaneous peak drains of the loads on a converter or rectifier, based upon a constant voltage input to the converter or rectifier.

Load: in general terms, the actual work required to be done by a machine. In terms of electricity, it is the current that flows through a circuit to serve the power requirements of one or more pieces of electrical equipment.

Meter: an electrical measurement device that records instantaneous values or cumulative values of electrical parameters, such as voltage, current and power.

Multiplexing: to transmit two or more signals over a single channel. Multiplexing equipment provides the capability of carrying the telecommunications transmissions of a number of devices or users at one time.

Ohm: the unit of electrical resistance.

Ohm's Law: a precise relationship exists between current, voltage and resistance. This relationship is called Ohm's law and is stated as follows:

The current in a circuit is directly proportional to the applied voltage and inversely proportional to the circuit resistance. Ohm's Law may be expressed as an equation:

$$I=E/R$$

I = current in amperes

E= voltage in volts

R = resistance in ohms

If any two of the quantities in the above equation are know, the third may be easily calculated.^{xix}

Power Board (PB): a component of the DC power plant that serves as the primary distribution point for DC power. Connections to BDFBs as well as connections for high current equipment/collocations (greater than 60 amps in the case of Qwest) originate at this point.

Power Distribution Cable: power cables extending from the BDFB or the Power Board to the telecommunications equipment or collocation arrangement.

Rectifier: a device that serves as a unidirectional conductor for converting alternating current to direct current. The rectifier offers a high opposition to current flow in one direction but not in the other.^{xx}

Redundant DC Power Leads See, A/B Distribution.

Relay Rack: open iron work designed to mount and support electronic equipment. A relay rack is to electronic equipment what a distribution frame is to wire.^{xxi}

Resistance: opposition to the flow of electric charge and is generally a function of the number of free electrons available to conduct the electric current.^{xxii}

Standby Engine: a fuel powered engine (e.g., gasoline, diesel, jet turbine) that drives a power generator for the purposes of providing a backup AC power source to replace or supplement utility-supplied AC power.

Voltage: the force that causes electrons to move in a conductor as an electric current. Measured in volts. When a difference in potential exists between two charged bodies that are connected by a conductor, electrons will flow along the conductor.^{xxiii}

Watt: a basic unit of power. It is equal to the voltage across a circuit multiplied by current through the circuit. This represents the rate at any given instant at which work is being done in moving electrons through the circuit.^{xiii} The formula for watt is $P = E \times I$, where: “P” represents power in watts, “E” represents voltage in volts, and “I” represents current in amperes.

FOOTNOTES

- i Telcordia Technologies, Notes on the Network Technologies Special Report SR-2275, Issue 4, October 2000, Section 9.3.2, page 9-21.
- ii Basic Electricity, prepared by the Bureau of Naval Personnel, Dover Publications, Inc., New York, page 159.
- iii Newton, Harry. Newton’s Telecom Dictionary, 21st Updated and Expanded Edition, CMP Books, San Francisco, page 39.
- iv Basic Electricity, prepared by the Bureau of Naval Personnel, Dover Publications, Inc., New York, page 32.
- v Newton, Harry. Newton’s Telecom Dictionary, 21st Updated and Expanded Edition, CMP Books, San Francisco, page 63.
- vi Newton, Harry. Newton’s Telecom Dictionary, 21st Updated and Expanded Edition, CMP Books, San Francisco, page 107.
- vii Basic Electricity, prepared by the Bureau of Naval Personnel, Dover Publications, Inc., New York, page 34.
- viii Telcordia Technologies, Notes on the Network Technologies Special Report SR-2275, Issue 4, October 2000, Section Glossary- 41.
- ix Clayton, Jade. McGraw-Hill Illustrated Telecom Dictionary, McGraw-Hill, New York, 1998, page 66.
- x Newton, Harry. Newton’s Telecom Dictionary, 21st Updated and Expanded Edition, CMP Books, San Francisco, page 144.
- xi Newton, Harry. Newton’s Telecom Dictionary, 21st Updated and Expanded Edition, CMP Books, San Francisco, page 172.
- xii Basic Electricity, prepared by the Bureau of Naval Personnel, Dover Publications, Inc., New York, page 458.

- ^{xiii} Clayton, Jade. McGraw-Hill Illustrated Telecom Dictionary, McGraw-Hill, New York, 1998, page 96.
- ^{xiv} Newton, Harry. Newton's Telecom Dictionary. 20th Ed., CMP Books, San Francisco, page. 212.
- ^{xv} Newton, Harry. Newton's Telecom Dictionary. 20th ed., p. 219.
- ^{xvi} Clayton, Jade. McGraw-Hill Illustrated Telecom Dictionary, McGraw-Hill, New York, 1998, page 120.
- ^{xvii} Newton, Harry. Newton's Telecom Dictionary, 20th ed., page 356.
- ^{xviii} Newton, Harry. Newton's Telecom Dictionary, 20th ed., page 356.
- ^{xix} Basic Electricity, prepared by the Bureau of Naval Personnel, Dover Publications, Inc., New York, page 58.
- ^{xx} Basic Electricity, prepared by the Bureau of Naval Personnel, Dover Publications, Inc., New York, page 270.
- ^{xxi} Newton, Harry. Newton's Telecom Dictionary, 20th ed., page 694.
- ^{xxii} Newton, Harry. Newton's Telecom Dictionary, 20th ed., page 698.
- ^{xxiii} Basic Electricity, prepared by the Bureau of Naval Personnel, Dover Publications, Inc., New York, page 27.