GE Zenith Controls

Product Bulletin

GeneratorJoe

ZNET™ Communication and Control Systems

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Communication is the key to success in any project. With the increasing complexity of building operations and the need to consolidate information and control points, owners require a solution to their site needs. Emergency power systems and their associated distribution are vital links within any installation and therefore the remote monitoring and control of these systems is a necessity rather than an option.

In the past, application of such systems has been hampered by the number of interconnecting wires required for signal and control, the interface of multiple software packages that may not link to each other because of proprietary protocols, the separation of the HVAC system from power monitoring and the lack of available products in the emergency power industry.

GE Zenith Controls introduces the ZNET™ communication system to solve these concerns and to provide single source responsibility for your emergency power monitoring system. Consisting of multiple solutions, GE Zenith's ZNET™ product line allows the owner to customize his system and easily add to it at a later point, whether with additional GE Zenith products or to interface it with other systems within the facility. GE Zenith's ZNET™ provides system options for the owner:

SIMPLICITY	Transfer Switch Interface and Remote Annunciator Panel
VERSATILITY	ZNET™ Monitoring and Control Software
ADAPTABILITY	Future upgrade or retrofit of existing equipment into the ZNET™ network

GE Zenith utilizes an *open protocol* system that is widely available and understood. The LonWorks based ZNET™ system can support multiple physical media (with routers between different types of media) and can support a large number of nodes which may be located in different areas.

These nodes can include microcontroller based systems, personal computers, PLCs, annunciators, etc. There is also the capability of peer to peer communication between nodes and the network is capable of handling high data transfer rates with secure transmission.

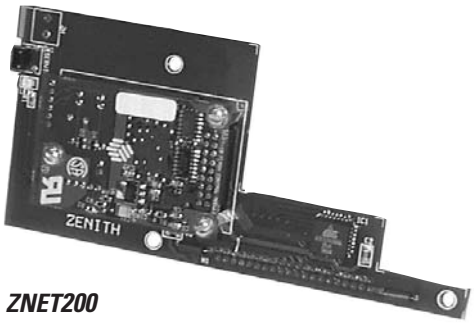
The ZNET™ transfer switch interface software package and custom SCADA/HMI systems are available for monitoring, control, data logging, debugging, etc.

GE Zenith has a long established track record which includes interfacing extremely complex systems including transfer switch and generator control systems as well as building management and facility control packages. GE Zenith's engineers design each system, whether a standard annunciation package or custom SCADA, with the critical nature of our product and your installation in mind.

ZNET™ systems are available in standard configurations for transfer switch installations as well as custom communications packages for paralleling switchgear, distribution and transfer switch projects. GE Zenith can also interface into most PLC, SCADA, power monitoring and building management systems.

Transfer Switch Network Interface

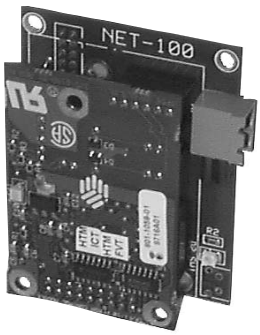
The ZNET™ system is available for all GE Zenith transfer switch products whether purchased today or several years ago. In addition, GE Zenith offers retrofit services and controls to allow interface of competitive products into the ZNET™ system. In this way, and with our open protocol, GE Zenith provides excellent system flexibility and the ability to ensure that your needs will not outgrow your investment.



ZNET200

ZNET200

The ZNET200 system card connects directly to GE Zenith's MX200 control panel and communicates directly with the micro controller. This combination provides the owner with the highest level of options and remote monitoring/control. Utilizing the ZNET1000 software system or ZNET™ SCADA, the user may interface directly with the ATS controller and set parameters at a remote location. Consult the feature chart on *Page 5* for more details (*specify ZNET200L for LonWorks or ZNET200M for Modbus*).



ZNET100

ZNET100

The ZNET100 system interface connects to the MX100 control panel and interfaces with the MX100 microprocessor and allows basic control, test and indication of the transfer switch functions. This unit may also be used with the ZNET1000 or SCADA software package (*LonWorks only*).

ZNET90

ZNET90

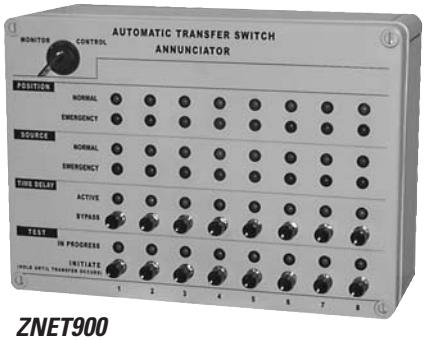
Designed for connection to GE Zenith's SSRCP control panel whether purchased today or in years past, the ZNET90 system provides a simple method to link combination relay logic/solid state controls to our network. This system is easy to retrofit to SSRCP units already installed in the field and may be used with ZNET1000 or SCADA software.

ZNET50

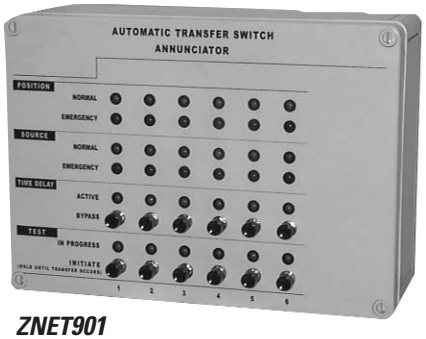
ZNET50

Many installations have older or competitive transfer switches within the facility. GE Zenith has designed a network interface with this application in mind. Available in standard and custom configurations as well as designed into ZNET1000 or SCADA software, GE Zenith can meet your needs for system integration.

NOTE:
24 VAC or DC supply required to annunciators. If not available on-site, specify ZNET10PS accessory for 120/240 - 24 VAC power adapter to be supplied by GE Zenith.



ZNET900



ZNET901

ZNET902P

ZNET903P

An owner may have many transfer switches scattered throughout his facility and therefore have a need for remote indication and control of the units. In its simplest form, this control may take the form of an annunciator panel. GE Zenith meets this application with the ZNET900 series of annunciators. Available in many different standard and custom configurations and with a multitude of options, the ZNET900 series has been designed to interface into the same open protocol network as the transfer switches and ZNET1000 software system.

The ZNET900 annunciator is available in either a 4 or 8 ATS configuration. The base unit contains the network interface card allowing a slave unit for an additional 6 ATSs to be attached without the need to purchase another interface. Multiple units can be installed anywhere on the network and the system allows for expansion to meet the needs of a growing facility.

The slave annunciator provides for up to 6 additional ATSs for each master annunciator installed. The ZNET901 mounts next to the master unit and shares the network interface and power supply.

Each master annunciator is provided with a standard serial interface port for an external printer. The printers (optional) may be either a standard table top or wall mounted tape printer.

These printers capture events occurring on the network including:

- ATS test
- ATS position change
- Source availability change
- Transfer/retransfer timer bypass
- Operator actions
- ATS identification

Printers are available as accessories from GE Zenith Controls. Specify:

ZNET902P — Tabletop dot matrix printer

ZNET903P — Wall or panel-mounted tape printer

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ZNET1000 Series Control Software

The ZNET1000 Series transfer switch control and monitoring system is a Windows 95/98 or Windows NT based package that allows the user to access, monitor and control multiple automatic transfer switches over a LonWorks based network.

The host PC software package provides software interfaces to the LonWorks network using OLE technology. It provides an object oriented, graphical interface as well as allowing the user interactive screens for system monitoring and control.

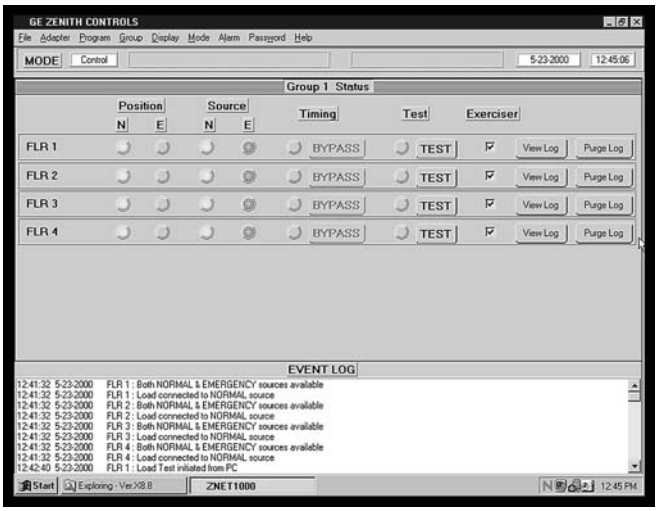
The ZNET™ software has alarm, historical data storage and trending capabilities which allow the operator to log data and view them later.

Simple pull-down menus allow the user to alternate between groups of switches, status screens, configuration and data information. The user is able to set a wide variety of parameters including test, exercise and timer/voltage values. Reference the chart on *Page 5* for the available features for each control interface.

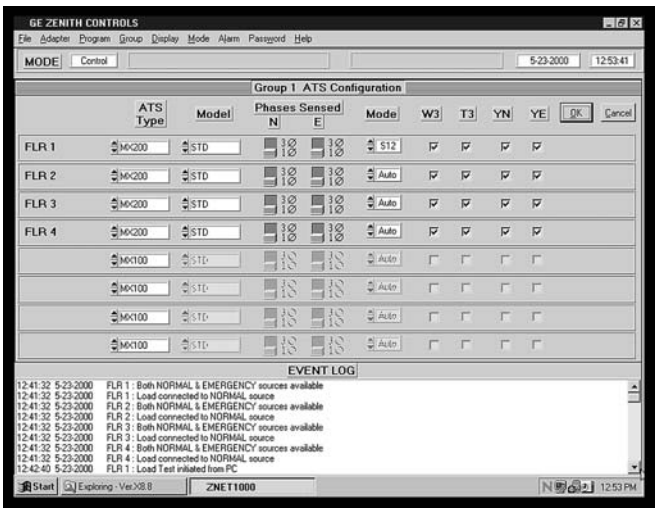
This open protocol system may be interfaced with a wide variety of options including:

- ZTS series transfer switches with the MX200 microprocessor
- ZTG series transfer switches with the MX100 microprocessor
- GE Zenith transfer switches with the SSRCP control panel
- Older GE Zenith and competitive products
- ZNET900 series annunciator panels
- Standard and cellular modems
- RF and IR communication devices
- Energy Commander paralleling switchgear systems, both PLC and non-PLC based
- ZNET™ SCADA systems
- Building management systems

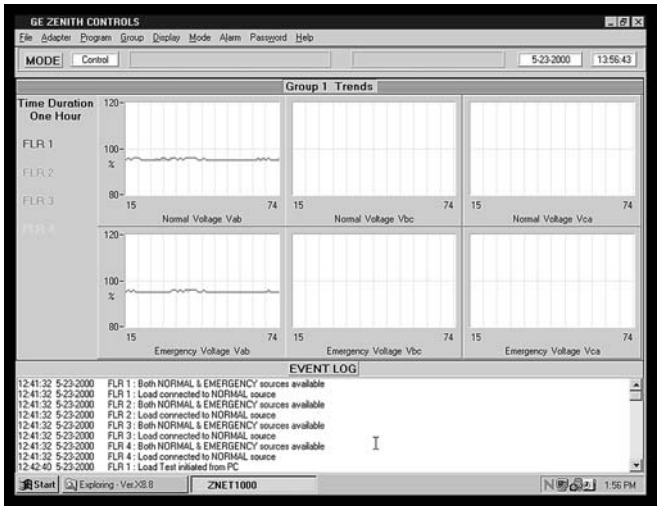
The ZNET™ hardware system is also compatible with gateways that allow use with Modbus, BACnet, Ethernet, and other networks. Consult the GE Zenith factory for further information on system interfaces and engineering requirements.



Status Screen



ATS Configuration Screen



Trends Screen

The ZNET™ system is flexible enough to work with a wide variety of transfer switches and controls. The chart below indicates which features are standard (S) within the ZNET1000 and ZNET1050 software and which controls will offer options (O). Older ZTS series switches may be retrofit with either an MX100 or MX200 series microprocessor to increase the available functions.

Parameter	ZNET1000 Monitor/ Control	ZNET1050 Monitor/ Control	ZNET200 MX200	ZNET100 MX100	ZNET90 SSRCP	ZNET50 Older GE Zenith and Competitive Products	ZNET900 Annunciator
Switch Position (Normal/Open/Emergency)	Monitor	Monitor	S	S	S	S	S
Normal Source Available	Monitor	Monitor	S	S	S	S	S
Emergency Source Available	Monitor	Monitor	S	S	S	S	S
Remote Test	Control	Control	S	S	S	S	S
Remote Test Mode (Load/No Load/Fast)	Control	Control	S				
Test Status	Monitor	Monitor	S	S	O	O	S
Exerciser Status	Monitor	Monitor	S		O	O	
Switch in Test or Exercise (Load/No Load)	Control	Control	S		O	O	
Time Delay Operating	Monitor	Monitor	S	S	S	O	S
Timer Bypass	Control	Control	S	S	S	O	S
Timer Setting Values (P, T, U, W, DT, DW, T3, W3, A6)	Control	—	S				
Timer In-progress Values (P, T, U, W, DT, DW, T3, W3, A6)	Monitor	Monitor	S				
Load Shed	Control	—	S		O	O	
Load Shed Status	Monitor	—	S		O	O	
Normal and Emergency Voltage Pickup and Dropout Values	Control	—	S				
Normal and Emergency Frequency Pickup Values	Control	—	S				
Controller Fault – Communication Link Fault	Monitor	Monitor	S		O	O	S
Switch not in Auto	Monitor	Monitor	S		O	O	
Aux 1, Aux 2	Control	—	S		O	O	
Switch Serial Number	Monitor	Monitor	S				
Network Address	Monitor	Monitor	S	S	S	S	
Normal and Emergency Voltages	Monitor	—	S				
Normal and Emergency Frequencies	Monitor	—	S				
Time in Emergency	Monitor	Monitor	S				
Number of Switch Transfers	Monitor	Monitor	S				
Inhibit Transfer to Normal/Emergency	Control	—	S		O	O	
Event Log (ZNET™ Software)	Monitor	Monitor	S	S	S	S	Print Only
Trending (ZNET™ Software)	Monitor	—	S				Print Only

ZNET™ Control Software

GE Zenith's ZNET™ system offers many options to make your installation meet your needs. ZNET™ is extremely versatile, offering an open protocol and well-proven architecture. Therefore, it may be configured to operate over different types of networks and with different methods of communication.

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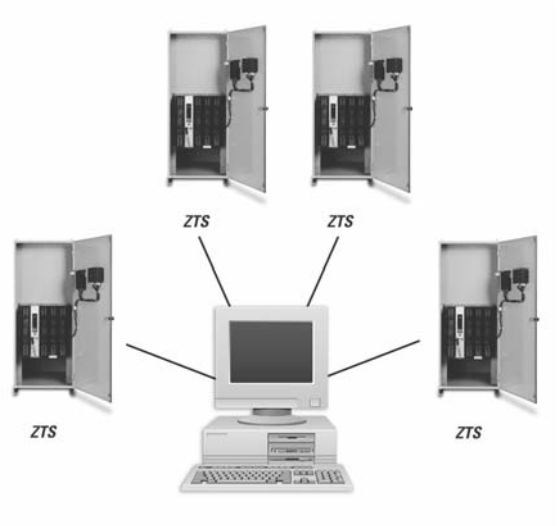
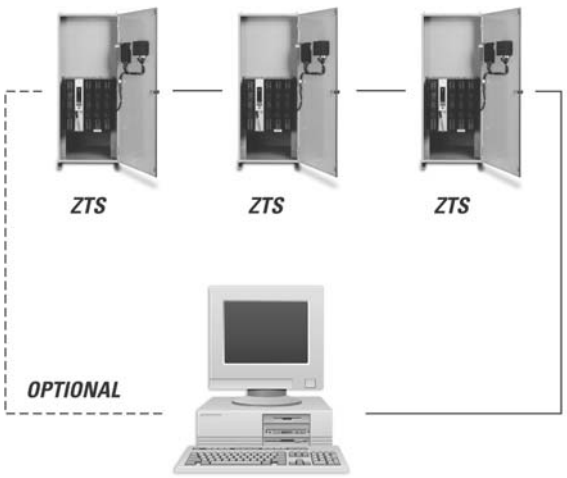


Star Bus



Ring or Network Bus

Optional Equipment

ZNET 10PS	Power Supply 120/240 - 24 VAC Mounted in enclosure
ZNET A1MOD	RS232/485 Converter for Modbus card only
ZNET ASLTA-10	LonWorks Network Adapter Card
ZNET APCLTA-10	Desktop Network Adapter Card
ZNET APCC-10	Laptop Network Adapter Card
ZNET30	ATS modem * (Consult factory for specifications)
ZNET31	Network system modem and adapter mounted in enclosure * Specify ZNET31M (Modbus) or ZNET31L (LonWorks)
ZNET902P	Tabletop printer, dot matrix type for use with ZNET1000 (continuous feed paper suggested)
ZNET903P	Tape printer for use with ZNET900 annunciator mounted in enclosure (specify 903PF for flush; 903PT for table top; or 903PX for open type)
ZNET200M - DEV	Modbus development kit with program software, flash programmer module, cable and manual
ZNET200M - FLASH	Modbus flash upgrade kit to download and update Modbus card firmware

* Dedicated phone line required for operation

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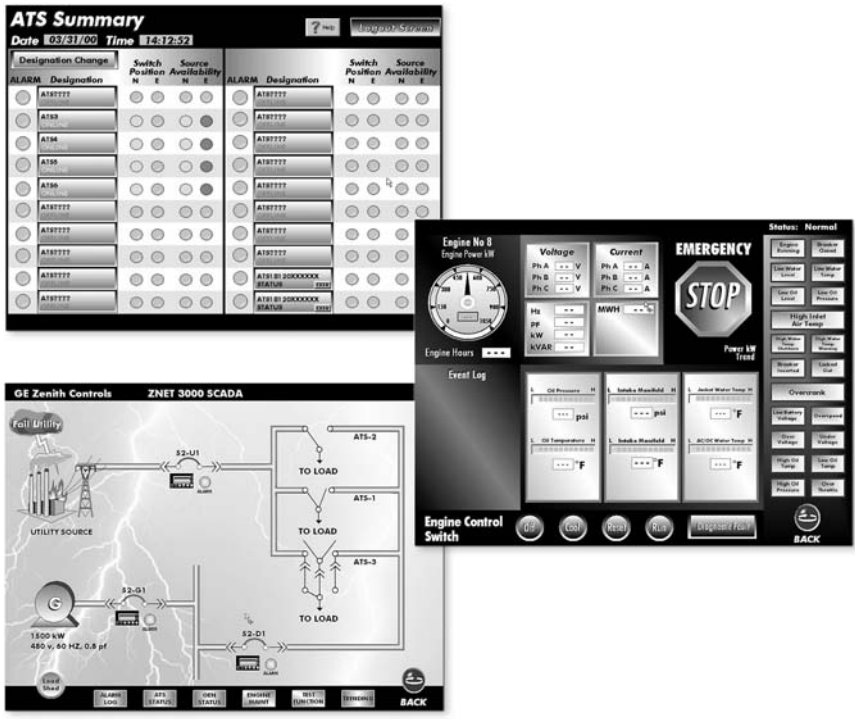
GE Zenith's ZNET3000 SCADA

GE Zenith's power monitoring and control system is a combination of its Energy Commander line of synchronizing switchgear, ZTS transfer switches and state-of-the-art supervisory control and data acquisition (SCADA) software. These products together provide for a powerful system which can provide many benefits to the user.

Primary Benefits

This user-friendly system allows the operator to remotely perform many power monitoring and control activities, thereby allowing the operator to:

- Automatically maintain operations and maximize power system reliability through emergency/standby schemes, load shedding schemes, breaker sequencing and power factor correction
- Become informed of critical situations via user-defined alarm set-points and quickly diagnose system data during an outage and return to service
- Reduce hardware and space needs (the proper equipment can replace conventional indicating meters and the necessary wiring)
- Enjoy complete system flexibility and make use of standard hardware products and industry standard communications
- Gain better control of power consumption



Additional Benefits

GE Zenith's power monitoring and control systems provide facility owners with these benefits:

- Help cut energy costs, reduce equipment downtime and improve equipment utilization (resulting in a greater return on investment)
- Identify and correct potential problems before equipment damage occurs, thereby prolonging equipment life as well as determining proper maintenance schedules

SCADA Features

- Operate with user-friendly Windows™ software
- Integrate with plant wide systems, such as building automation, energy management, distributed process control and security systems
- Integrate switchgear and transfer switch monitoring and control
- Manually control circuit breakers, check present settings and access breaker trip history
- View the switchgear elevation drawing and the one-line diagram, complete with status information and real-time metering values
- View traditional metering of true RMS currents, voltages, power factor, frequency, watthours, varhours, demand current, demand power and more
- Monitor, capture, store and analyze waveform data from all three phases of current and voltage for a given circuit
- Display the status of any discrete input monitored, such as breaker status, transformer fans on/off, liquid levels and more
- Record times and dates of peak demand periods and last meter resets, energy management alarm history plus minimum and maximum operating ranges for 20 meter values through the software's superior data communications networking ability
- Monitor temp levels of power transformers
- Program the system to accept and report analog and digital inputs such as pressure, gas, steam and critical battery voltage levels
- View operating and maintenance instructions on-line

Glossary of Common Terms

Analog: *A continuous real-time function or parameter in which the information values are represented in a variable and continuous waveform.*

Annunciator: *Electrically controlled signal board or indicator typically used in a network configuration.*

ANSI: *American National Standards Institute. The principal standards development body in the USA.*

ASCII: *American Standard Code for Information Interchange. A universal standard for encoding alphanumeric characters into 7 or 8 binary bits. (Drawn up by ANSI to ensure compatibility between different computer systems).*

Asynchronous Transmission: *Communications in which characters can be transmitted arbitrarily, at any unsynchronized time, and where the time intervals between transmitted characters may be of varying lengths. Communication is controlled by start and stop bits at the beginning and end of each character.*

Baud Rate: *A unit of speed that refers to the number of discrete bytes per second, and which refers to the number of times the condition of the communication line changes.*

BIT: *The smallest unit of data processing information. A BIT (or Binary DigIT) assumes a value of either 1 or 0 in the binary number system, and is used in representation of digital variables.*

Bps: *Bits per second. This is the unit of data transmission rate used in our system.*

BSC: *Bisynchronous Transmission – A byte or character oriented communication protocol that has become the industry standard. It uses a set of control characters for synchronized transmission of binary coded data between stations in a data communications system.*

Bus: *A data path shared by many devices, with one or more conductors for transmitting signals, data or power.*

Byte: *A data unit of eight bits of information; sometimes called a "character".*

Client: *Software requesting data from a device.*

COM Port: *A hardware port used for transmission of data between computers or between computers and peripheral devices one bit at a time over two single lines.*

Digital Signal: *Discrete, uniform signals as opposed to the continuously varying levels of an analog signal.*

DDE: *Dynamic Data Exchange – A Microsoft™ software protocol from which Windows-based applications share information.*

Duplex: *The ability to send and receive data over the same communications line.*

Encoder: *A circuit which changes a given signal into a coded combination for purposes of optimum transmission of the signal.*

Firmware: *A computer program or software stored permanently in PROM (Programmable Read-Only-Memory) or ROM (Read-Only-Memory), or semi-permanently in EPROM (Erasable Programmable Read-Only-Memory).*

Full Duplex: *Two-way simultaneous communication; also known as echo-plex since the local device expects the remote device to echo back the transmitted characters.*

Gateway: *A device used to connect two different networks which translates the different protocols so that they become compatible with each other.*

GUI: *Graphical User Interface – The front-end system interface which is graphically oriented for making it easier to use.*

Half Duplex: *Transmission in either direction, but not a simultaneous two-way transmission.*

Host computer: *The central computer at the other end of a dial-up connection in a network. This computer is remotely accessed and therefore relinquishes network control.*

Interface: *A shared boundary defined by common physical inter-connection characteristics, signal characteristics and measuring of interchanged signals.*

LAN: *Local Area Network – A data communications network or system that provides interconnection of a variety of data communications devices within a small, limited geographical area (typically a few hundred feet) with moderate to high transmission rates (from a minimum of 100 kbps to a maximum of 50 Mbps).*

Multidrop: *A single communication line or bus used to connect three or more points in a network.*

Network: *An interconnected group of nodes or stations.*

Network Topology: *The physical and logical relationship of nodes in a network; the schematic arrangement of the links and nodes of a network typically in the form of a star, ring, tree or bus topology.*

Node: *A point of interconnection to a network. Could also refer to any intelligent device connected to the network. This includes terminal servers, host computers, and any other devices (such as printers and terminals) that are directly connected to the network.*

Packet: *A series of bits containing data and control information, including source and destination node addresses, formatted for transmission from one node to another.*

Parallel Transmission: *A transmission model where multiple data bits are sent simultaneously over separate parallel lines. Accurate synchronization is achieved by using a timing (strobe) signal. This type of transmission is usually uni-directional.*

PLC: *Programmable Logic Controller – An intelligent digital device that can be programmed to control the logic or sequence of activities in certain elements to which it is connected in a circuit or network.*

Port: *A physical connector on a device which is typically used for input/output of digital and analog signals.*

Protocol: *A formal set of conventions governing the formatting, control procedures and relative timing of message exchange between two communicating systems.*

RAM: *Random-Access-Memory – Semiconductor read/write volatile data where loss of data can occur if power supply is turned off or even temporarily disrupted.*

Repeater: *A network device that repeats signals from one cable onto one or more other cables while restoring signal timing and waveforms.*

Serial Transmission: *Transfer of data characters one bit at a time sequentially, using a single electrical path.*

Server: *A computer or software application that provides data to a client computer or other application in a network.*

Synchronous Transmission: *Transmission in which data bits are sent at a fixed rate with the transmitter and receiver synchronized. This type of transmission also eliminates the need for start and stop bits (which is a requirement for asynchronous transmission).*

Topology: *Physical configuration of network nodes. (e.g. bus, ring, star, tree, etc).*

Transceiver: *A combination of transmitter and receiver packaged as one element or device.*

Transducer: *Any device that generates an electrical signal from real-world physical measurements; also a generic term for sensors and their supporting circuitry.*

Twisted Pair: *A data transmission medium, consisting of two pairs of insulated copper wires twisted together. Twisting improves its immunity to interference from nearby electrical sources that may corrupt the transmitted signal.*

UTP: *Unshielded Twisted Pair.*

WAN: *Wide-Area-Network – A network using common carrier transmission services for the transmission of data over a large geographical area.*

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