



HORNER AUTOMATION GLOSSARY

SYMBOL WORDS

%I Digital Input

Single-bit input registers. Typically, an external switch is connected to the registers.

%Q Digital Output

Single-bit output registers. Typically, these bits are connected to an actuator, indicator light or other physical outputs.

%AI Analog Input

16-bit input registers used to gather analog input data such as voltages, temperatures, and speed settings coming from an attached device.

%AQ Analog Output

16-bit output registers used to send analog information such a voltages, levels, or speed settings to an attached device.

%R General Purpose Register

Retentive 16-bit registers.

%T Temporary Bit

Non-retentive single-bit registers.

%M Retentive Bit

Retentive single-bit registers.

%K Key Bit

Single-bit flags used to give the programmer direct access to any front panel function key (F1, F2, etc.) appearing on a unit.

%D Display Bit

Single-bit flags used to control or monitor display screen on units that have screens.

%S System Bit

Single-bit bit coils predefined for system use.

%SR System Register

16-bit registers predefined for system use.

A

AC - Alternating Current

Refers to the flow of charge, which reverses directions or “alternates”. Consequently, the voltage level also reverses direction. Commonly used to power residences and office buildings.

Acceleration

The rate of change of velocity. Negative acceleration is usually described as deceleration.

Accumulator

A register/variable used to gather or accumulate a total of time, counts, items, or events.

ACK - Acknowledgement

An ASCII control character used to acknowledge the reception and acceptance of a transmission block. The state of an alarm that may or may not still be active but has been acknowledged.

Actuator

A device used to move or control a mechanism. Its purpose is to translate a control signal into a mechanical action. An example would be an electric motor.

Adaptation Layer

The adaptation layer serves to “adapt” data by breaking it down into cells, sending them through a transmitter and reassembling them on the other side through the receiver.

ADC - Analog to Digital Converter

A module whose job is to convert real-world analog values (temperature, tank fill level, etc.) into a digitized representation that can be used by the controller.

Address

1. A number that uniquely identifies a memory location or I/O point.
2. A character string that uniquely identifies the physical location of an input or output circuit.

Addressing Modes

The term addressing modes refers to the way in which the operand of an instruction is specified. The addressing mode specifies a rule for interpreting or modifying the address field of the instruction before the operand is actually executed.

Alarm Programming

A continuously executed background program used to check for, and to report, alarm conditions in the controllers it monitors.

Ambient temperature

The temperature of the medium (air, water, earth) into which the heat of the equipment is dissipated.

American Wire Gauge - AWG

A standard system used for designating the size of electrical conductors. Gauge numbers have an inverse relationship to size; larger numbers have a small cross-sectional area. However, a single-strand conductor has a larger cross-sectional area than a multi-strand conductor of the same gauge so that they have the same current-carrying specifications.

Analog Circuit

1. A circuit in which the signal can vary continuously between specified limits.
2. A circuit that provides a continuous function.
3. Contrasted with Digital Circuit.

Arithmetic Capability

The ability to do addition, subtraction, multiplication, and division, or advanced math functions within a processor.

ASCII - American Standard Code for Information Interchange

ASCII-coded characters are single-byte values in the range of 0 (zero) to 127. Codes in the range 128 to 255 are not defined by the ASCII standard, but rather by the equipment manufacturer.

Asynchronous

1. Lacking a regular time relationship; not related through repeating time patterns.
2. Not dependent on the scan rate of the OCS.
3. Contrasted with Synchronous

Attribute

Attributes in Cscape/OCS are normally associated with graphics objects, i.e. visibility, flash, color.

Authenticate

Refers to the process of confirming the identity of a person or device.

Axis

1. A principal direction along which a movement of the tool or work piece occurs.
2. An axis is a line with respect to which a curve or figure is drawn, measured, rotated, etc.
3. A coordinate grid has perpendicular lines, or axes. The horizontal axis is the **x-axis**, the vertical axis is called the **y-axis**, and the depth axis is called the **z-axis**.

B

Backup or Back Up

The process of copying data or files to use in case the original data or files become lost or destroyed.

Backup Battery

A battery that will provide power to memory only when the main power source is off.

Bandwidth

The range of frequencies over which a system is designed to operate. The bandwidth is expressed in Hertz between the highest and lowest frequencies.

Baud (Bd)

A data transmission unit that shows how many signaling elements or symbol changes (electronic state change) are sent per second in a line code or a digitally modulated signal.

Battery temperature (Tb)

The battery temperature is equal to the CPU temperature minus 30°C: $T_b = CPU^\circ - 30^\circ C$. For example, in battery status, CPU temperature shows 73°C. The battery temperature is 43°C, and the charging state would be Normal Charging. Battery charging state also depends on battery voltage.

Bit

Combination of "binary" and "digit" - the smallest unit of measurement used to measure computer data.

Bit Rate

The number of bits per second.

Bitmap - (BMP)

A non-compressed image file format which uses small dots in a grid pattern to create an image.

Block

A set of words or bytes handled as a unit, but not addressable as a unit. A block is typically defined by the number of words in length and the starting word address.

Board

A printed-circuit board

Boolean- [Data Type BOOL]

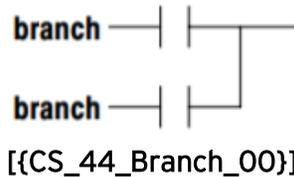
A single bit, binary value, or register/variable. Boolean points have only two possible values, 'TRUE' or 'FALSE'.

Boot loader

A type of program which loads and starts the boot time tasks and processes of an operating system or the computer system. It enables loading the operating system within the computer memory when a computer is started or booted up.

Branch

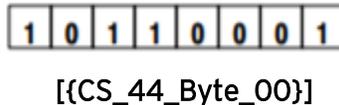
A parallel logic path within a ladder logic rung.

**Bus**

A single path or multiple parallel paths for power or data signals to which several devices may be connected at the same time. A bus may have several sources of supply and/or several sources of demand.

Byte - [Data Type BYTE]

A string of 8 consecutive bits. A single BYTE is also the size of a single ASCII character.



C

Calibration

The process of comparing an instrument or device with a standard to verify its accuracy, to make adjustments to meet the standard, or to devise a corrected scale.

CAD - Computer-Aided Design

A computer-based system developed to facilitate design of mechanical parts.

CAN - Controller Area Network

A serial network technology that was originally designed for the automotive industry has also become a popular bus in industrial automation as well as other applications.

CANopen

A CAN-based communication system. It comprises higher-layer protocols and profile specifications. CANopen has been developed as a standardized embedded network with highly flexible configuration capabilities.

Central Processing Unit - CPU

1. The portion of a computer or programmable controller that controls the interpretation and execution of the user program stored in memory.
2. The PLC processor.

Character

One symbol of a set of symbols, i.e. ASCII data, that normally includes both alpha and numeric codes plus punctuation marks and other symbols that may be read, stored, or written.

CIP - Common Industrial Protocol

A comprehensive suite of messages and services for the collection of industrial automation applications – control, safety, energy, synchronization, motion, information, and network management.

Child Directory

Examples: "Root Directory", "Parent Directory" and "Child Directory" - With a directory, a **parent directory** is a directory that contains the current directory. A **child directory** is a subdirectory. **Root directory** is the "highest" directory in this hierarchy.

Clear

1. To zero out one or more variables/registers.
2. To delete the contents in memory, such as the program in an OCS.

Clone

The process of duplicating an application, program, or object. The term can be used to refer to an object, programming or an application that has similar functions and behavior to another object or application program.

Coils - aka Electromagnetic Coil

Conducting wire such as copper shaped in a helical form around an iron core. A coil is the electromagnetic part of a relay that acts to close or open the relay's electrical contacts. In Cscape and OCS, a coil is the standard output of a ladder logic rung, symbolized by open/close parentheses -()-. Output coils may be Normally Open -()-, Normally Closed -(/)-, Set -(S)-, Reset -(R)-, Positive Transition -(P)-, and Negative Transition -(N)-.

Cold Charging

Under normal charging conditions, charging can take up to 8 hours. Cold or Hot charging can take up to 40 hours to fully recharge the battery. Cold charging is between 0-10°C (or 32-50°F). Anything lower will cause the battery not to charge. Normal charging takes place between 11-45°C (or 51.8-113°F). **NOTE:** Temperature ranges are for the battery itself and not ambient temperature.

Configuration

The manner in which components are arranged to make up the computer system. Configuration consists of both hardware and software components. Sometimes, people specifically point to hardware arrangement as hardware configuration and to software components as software configuration.

Connection Medium (or Communication Medium)

Refers to the physical channel through which data is sent and received. Data is sent in the form of voltage levels which make up the digital signal. A digital signal consists of 0s and 1s; essentially, a 1 corresponds to a high voltage, while a 0 corresponds to a low voltage.

Consumers

A device that receives data from one or more Producers. An EGD network device configured to receive one or more Exchanges.

Control Variable - aka CV

The output of a process controller (Proportional, Proportional/Integral, or Proportional/Integral/Derivative) used to "drive" the process towards the desired setpoint.

Control Panel

A panel that may contain instruments, controllers, or operator interface devices that allow an operator to access and control operations.

Corruption

When files are not written correctly, saved improperly, or modified by another file, they can become **corrupt**. When a file becomes corrupt, it cannot be opened without errors and in some cases, may not be able to be recovered or fixed without the file being replaced by a backup.

CsCAN - Cscape Control Area Network

Horner APG's proprietary network protocol that runs on the Bosch CAN network specifications. Prior to the advent of the OCS.

Coordinated Universal Time (UTC)

The primary time standard by which the world regulates clocks and time.

Counts per Rev. or Revolution (CPR)

CPR most commonly stands for Counts per Revolution, and refers to the number of quadrature decoded states that exist between the two outputs A and B. With both outputs A and B switching between high and low, there exists 2 bits of information represented as 4 distinct states. See also Pulses per Revolution.

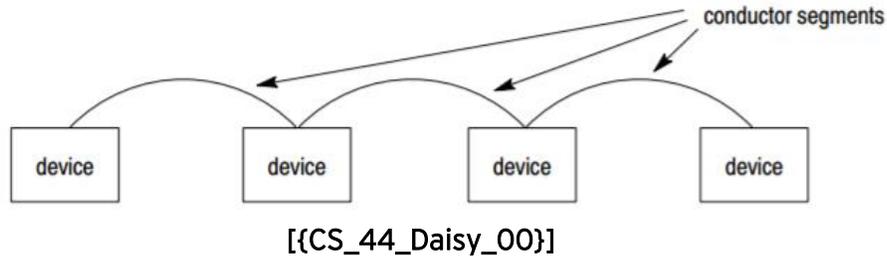
Cycle

1. A sequence of operations that is repeated regularly.
2. The time it takes for one sequence of operations to occur.
3. To turn off and then turn on a controller, i.e. Power Cycle or Cycle the Controller.

D

Daisy Chain Configuration

1. In a linear arrangement or parallel (bus) connections, a physical configuration such that each device is connected on the bus as the junction of two conductor segments, with no drop line between the device and the junction of the conductor segments.
2. Contrasted with a Star Configuration and a Trunk-Line or Drop-Line Configuration.



Data

A general term for any type of information.

Data bits

Quantity of bits used to represent one character of one unit of data.

Data Field

This is a special part of the display that is controlled by data appearing in a controller's register/variable. The programmer specifies how the data is to be displayed, and from which register/variable the data comes.

Data logging

The process of recording data over a period of time in order to analyze specific trends or record the data-based events/actions of a system, network, or IT environment. It enables the tracking of all interactions through which data, files, or applications are stored, accessed, or modified on a storage device or application.

Data Mapping

Data mapping is the process of mapping data fields from a source file to their related target fields.

DC Power - Volts DC - VDC

Stands for "direct current," which means that the current (or electric charge) flows in a single direction as opposed to alternating directions as in AC power.

Deadband

Normally associated with the PID function, the deadband defines a range of operation where the output is "good enough" and the PID will not try to adjust further.

Derating

A technique usually employed in electrical power and electronic devices, wherein the devices are operated at less than their rated maximum power dissipation, considering the case/body temperature, the ambient temperature and the type of cooling mechanism used.

DeviceNet™ Network

A global industry-standard open communication network designed to provide an interface through a single cable from a programmable controller processor directly to various devices.

Double Integer - [Data Type DINT]

A 32-bit signed value. Double Integers are used where the value of the data is expected to be in the range of -2,147,483,648 to +2,147,483,647.

Do I/O Mode

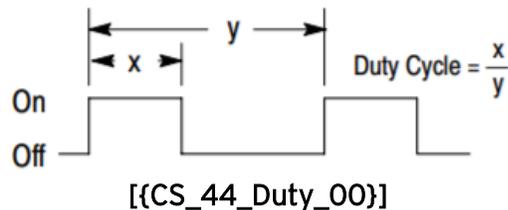
This is an operational mode of OCS controllers. It is indicated by the yellow light in Cscape and a flashing RUN indicator on the controller. In this mode, the controller will perform I/O point update cycles but does *not* execute the ladder logic program.

DSP - Digital Signal Processors

Take real-world signals like voice, audio, video, temperature, pressure, or position that have been digitized and then mathematically manipulate them. A DSP is designed for performing mathematical functions like "add", "subtract", "multiply" and "divide" very quickly.

Duty Cycle

The ratio of pulse width to the interval between like portions of successive pulses. Usually expressed as a percentage.

**DWORD - [Data Type DWORD]**

A string of 32 consecutive bits. DWORD values are used where the value of the data is not as important as the bit patterns (shifts and rotates).

Dynamic

Refers to actions that take place at the moment they are needed rather than in advance. (Opposite of static). Example is a dynamic webpage which automatically updates based on data it receives. As for static webpages, the information is already set and will not change unless someone goes in and updates it manually.

E

EGD - Ethernet Global Data

EGD is a communications protocol developed by GE. EGD allows a device (the Producer) to transfer data to other devices (the Consumers) on the network.

Electrical Noise

Noise, or interference, can be defined as undesirable electrical signals, which distort or interfere with an original (or desired) signal. Noise could be transient (temporary) or constant.

Encapsulate

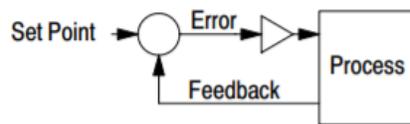
Refers to sending data where the data is augmented with successive layers of control information before transmission across a network. The reverse of data encapsulation is decapsulation, which refers to the successive layers of data being removed (essentially unwrapped) at the receiving end of a network.

Encoder

A sensor or transducer for converting rotary motion or position to a series of electronic pulses.

Error (Deviation)

In any control loop, the differences between the set-point signal and the feedback signal. An error is necessary before a correction can be made in the controlled system. In a positioning loop, the difference between the instantaneous position command signal generated by the summation of the federate, and the actual position signal generated by the summation of the feedback.



[{CS_44_Error_00}]

Ethernet

The standard way to connect computers on a network over a wired connection. It provides a simple interface and for connecting multiple devices, such as computers, routers, and switches.

Ethernet Switch

Functions as a central station connecting computers, printers, and every other wired device to each other. The switch is also wired to the router and modem to access the Internet.

Exchange

A block of data sent by a Producer and received by one or more Consumers. Normally associated with the EGD protocol.

F

Fail-Safe System

A set of features that allow an application to continue running in the event of certain types of "soft" failures. These "soft" failures include: Battery power loss, Battery-Backed Register RAM, or Application Flash corruption.

Fieldbus

A group of protocols, such as: ControlNet, Modbus, Profibus, EtherCAT, HART, CIP, and others.

Filename Extension

A string of characters attached to a filename to identify the format of the file. (Ex: .BMP for Bitmap).

Firewall

A device or software on an Ethernet network designed to block traffic from entering the network behind it. See also Gateway.

Firmware

Permanent software programmed into a read-only memory.

Fkeys - Function Keys

See Function Keys entry.

FLASH or FLASH Memory

A type of electrically erasable programmable read-only memory.

Floating Ground

An electrical circuit common that is not at earth ground potential or the same ground potential as circuitry with which it interfaces. A voltage difference can exist between the floating ground and the earth ground.

Floating Point or REAL Numbers

These numbers use IEEE 754-1985 format to store numbers in following ranges.

32-bit single-precision floating point (REAL) – $-3.40282E+38$ to $+3.40282E+38$

64-bit double-precision floating point (LREAL) – $-1.79769E+308$ to $+1.7976E+308$

Floating Point refers to both REAL and LREAL data types.

Frequency Input

The number of times an electromagnetic signal repeats an identical cycle in a unit of time, usually one second.

FTP - File Transfer Protocol

A standard Client/Server Internet protocol, based on RFC959, which supports file transfers over a TCP/IP network.

Full Duplex

Full-Duplex devices are able to Send and Receive data simultaneously, often referring to RS232 or 4-Wire RS485.

Full Scale

The maximum level that can be measured. The maximum value that may be entered or produced by analog signals into mapped addresses or variables.

Function blocks

A programming function represented by a graphical box or block, usually in Ladder Logic or Function Block Diagram (FBD) program.

Function Block Diagram

One of five programming languages of the IEC61131 programming standard. See also Structured Text, Sequential Function Chart, Ladder Diagram, or Instruction List.

Function Keys

Keys on the controller labeled F1, F2, F3, etc. The function of each key is defined by software. Also called Fkeys.

G

Gateway or Gateway Server

A device on a network that allows access to an outside network, such as the Internet. See also Firewall.

Ground

A conductive connection between a circuit or piece of equipment and the earth. Grounds are fundamentally used to protect an application from harmful interference causing either physical damage such as by lightning or voltage transients or from circuit disruption often caused by radio frequency interference (RFI). Grounding is also for the safety of the user.

H

Half Duplex

Half-duplex devices are able to Send and Receive data, but only one direction at a time, often referring to 2-wire RS485 devices.

Handshake

Handshaking is an automated process that sets parameters for communication between two different devices before normal communication begins. Much like the way a human handshake sets the stage for the communication to follow, the computing handshake provides both devices with the basic rules for the way data is to be shared between them. These rules can include transfer rate, coding alphabet, parity, and interrupt procedure.

Hard Key / Soft Key

“Hard Keys” have the same function no matter the context. Conversely “Soft Key” refers to buttons whose function changes depending on the context. They typically use part of the display to identify their current function.

Hexadecimal

A base-16 numbering system which uses the symbols 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F for numeral.

HSC - High Speed Counter

A high-speed counter is a hardware-based counter to capture the state of the inputs. It is used when inputs are switched at such a high speed that the program cycle scan would be too slow. High Speed Counter inputs may be processed asynchronously from the OCS scan.

HMI - Human-Machine Interface

A user interface or dashboard that connects a person to a machine, system, or device. It is also known as Man-Machine Interface (MMI), Operator Interface Terminal (OIT), Local Operator Interface (LOI), or Operator Terminal (OT). The HMI of a Horner controller is the display, touchscreen, and/or keypad.

Hot Charging

Under normal charging conditions, charging can take up to 8 hours. Cold or Hot charging can take up to 40 hours to fully recharge the battery. Hot charging is between 46-60°C (or 114.8-140°F). Anything above that will cause the battery not to charge. Normal charging takes place between 11-45°C (or 51.8-113°F). **NOTE:** Temperature ranges are for the battery itself and not ambient temperature.

HTTP (Web Server) - Hypertext Transfer Protocol

A standard Client/Server Internet protocol, based on RFC1945, which transfers web content over a TCP/IP network.

HTTPS - Hypertext Transfer Protocol Secure

A secure version of the HTTP protocol that uses the SSL/TLS protocol for encryption and authentication.

Hub or Network Hub

A common connection point for devices in a network. Hubs are devices commonly used to connect segments of a LAN. The hub contains multiple ports.

I**IC - Integrated Circuit**

A solid-state device that includes combinations of circuit elements (resistors, capacitor, transistors) that are fabricated on or within a single continuous substrate (supporting semiconductor for the circuit).

ICMP - Internet Control Message Protocol

ICMP is used for diagnostic purposes only, to determine if another device exists on the Ethernet network. Using ICMP, the OCS sends Ping Echo Requests to another device and expects the other device to answer with Ping Echo Responses. The OCS measures the round-trip time of each Ping Echo Request / Response exchange and puts the result (in milliseconds) into an OCS register/variable.

Idle Mode

This is an operational mode for the attached controller. In this mode, the controller does not perform I/O point scans, and the ladder logic program is not being solved. Idle Mode is indicated in Cscape with the red stoplight. It is indicated on the controller with the extinguished RUN indicator.

Inductive Loads

In inductive loads, such as an electric motor, the voltage wave is ahead of the current wave. The difference between the two waves creates a secondary voltage that moves in opposition to the voltage from the energy source, known as inductance. Because of this property, inductive loads tend to experience power surges when they are turned on and off, a phenomenon not seen with resistive loads.

InitRD - Initial RAM Disk

InitRD provides the capability to load a RAM disk by the boot loader.

I/O or Input / Output

An input device sends information to a computer system for processing, and an output device reproduces or displays the results of that processing. The term "I/O" may be used to refer to any device or all of the devices that are providing Inputs and Outputs to the system.

Integer - [Data Type INT]

A 16-bit signed value. Integers are used where the value of the data is expected to be in the range of -32,768 to +32,767.

Integral Control

A method of controlling a process where a controlling action is developed based on how long an error exists.

Instruction List

One of five programming languages of the IEC61131 programming standard. See also Structured Text, Sequential Function Chart, Ladder Diagram, or Function Block Diagram.

IP Address - Internet Protocol

This is the address of a device on an Ethernet or Wi-Fi network. Horner controllers currently use IPv4 standards with addresses consisting of 4 numbers, or octets, separated by decimal points.

I/O Cycle

The time during the controller's **Scan Time** that values are actually transferred between the controller's registers/variables and the physical Input/Output.

ISO - International Organization for Standards

An organization established to promote development or international standards.

J

Jumper / Jumper box

A jumper is made of two or more electrically conductive jumper pins and jumper box. The set of electrically conductive pins is separated from each other by a plastic material. The jumper box is made up of an electrically conductive material which easily allows electric current through it and this electrically conductive material is covered with a non-conductive plastic block to prevent accidental short circuits.

K

K byte - Kilobyte

A unit of computer memory or data storage capacity equal to 1,024 (2^{10}) bytes.

kHz - kilohertz

A unit of measurement of frequency, also known as cycles per second. One kilohertz (kHz) is equal to 1,000 Hertz (Hz) or 1,000 cycles per second.

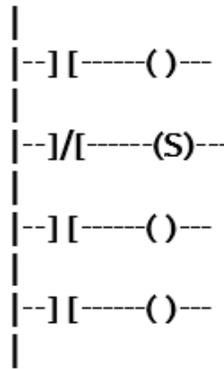
L

Ladder Diagram

One of five programming languages of the IEC61131 programming standard. See also Structured Text, Sequential Function Chart, Function Block Diagram, or Instruction List.

Ladder Logic

Ladder Logic is a programming language developed for use on a controller. It is based on a simulation of older "drum controllers" which provided a set of contacts to be "made" or "broken" as the position of a "rotor" changed. These contacts, when "flattened" into a single line, resemble the rungs of a ladder:



[{CS_44_Ladder_00}]

LAN - Local Area Network

Also called Ethernet port, network connection, and network port, the LAN port allows a computer to connect to a network using a wired connection.

Latch aka Strobe

A special function that uses a digital logic circuit to store one or more bits. A latch has a data input, a clock input, and an output. When the clock input is active, data on the input is "latched" or stored and transferred to the output register/variable either immediately or when the clock input goes inactive. The output retains its value until the clock goes active again. When the Latch function is active, it takes the current value of the Accumulator and moves it into the "Latch Value" register/variable.

Latency

The delay from input into a system to the resulting output.

LED

Light-Emitting Diode

Linux Kernel

Called a “kernel” because of its function within the operating system, much like a seed residing inside a shell, the Linux® kernel is the main component of a Linux operating system (OS) and is the core interface between a computer’s hardware and its processes. It communicates between the two, managing resources as efficiently as possible.

Local Controller

This is the controller that is connected directly to Cscape.

Logic

A term referring to the programming code used to make the controller do what it needs to do.

Loop

A sequence of instructions that is executed repeatedly until a terminating condition is satisfied.

M

MAC ID - Media Access Control

Where IP addresses are associated with TCP/IP (networking software), MAC addresses are linked to the hardware of network adapters. A MAC address is a hardware identification number that uniquely identifies each device on a network.

Marker

Input into the OCS that indicates a particular position. Typically, an encoder has a marker output that represents a specific point in the rotation.

Master / Slave

A model for a communication protocol in which one device or process (known as the **master**) controls one or more other devices or processes (known as **slaves**). Once the master/slave relationship is established, the direction of control is always from the master to the slave(s). The Master/Slave terminology is normally reserved for serial communications. The corresponding Ethernet communications terminology is Client/Server, where Client would be the equivalent to “Master” and Server would be the equivalent to “Slave”.

Mbps

Megabits per second and is a unit to measure the speed of a network.

MDI/MDI-X - Medium Dependent Interface/MDI Crossover

An Ethernet port connection using twisted pair cabling. The MDI is the component of the media attachment unit (MAU) that provides the physical and electrical connection to the cabling medium. An MDIX is a version of MDI that enables connection between like devices. MDI ports connect to MDIX ports via straight-through twisted pair cabling; both MDI-to-MDI and MDIX-to-MDIX connections use crossover twisted pair cabling.

ms - Millisecond

Unit for measuring time in increments of 1/1000 of a second, hence 1 second is 1000ms.

Modbus

A popular, de-facto standard protocol that allows industrial devices from multiple manufacturers to easily share data in real-time. Can be run over serial communications such as RS-232 and RS-485, as well as Ethernet. Modbus over Ethernet is usually referred to as Modbus TCP/IP.

MTU Size - Maximum Transmission Unit

A maximum transmission unit (MTU) is the largest packet or frame size, specified in octets (eight-bit bytes) that can be sent in a packet or frame-based network such as the internet. Networks usually have a limited MTU size of less than 1500 bytes.

N

NEMA

National Electrical Manufacturers Association

Net M- Net Mask (sometimes called Subnet Mask)

A 32-bit binary mask used to divide an IP address into subnets and specify the network's available hosts.

Net Use %

CAN network bandwidth % used.

Network Drop

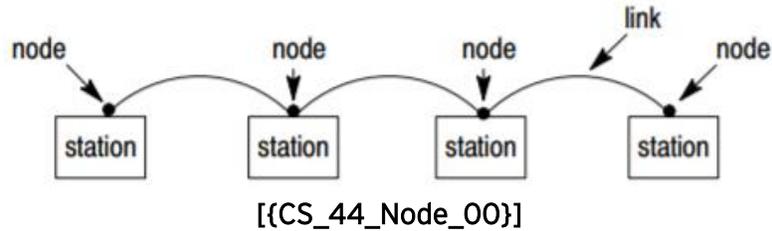
A branch off a network trunk line that connects a device to the network.

Network ID

Usually refers to the ID of the device on a supported CAN, such as CsCAN, CANOpen, etc. Each device must have a unique network ID. Also called Node ID.

Node

Any system or device connected to a network is referred to as a node.

**NODE ID**

See Network ID.

Noise

Unwanted electrical disturbances imposed upon a signal that tend to obscure its data content. Noise can also disturb power supplies and cause unwanted behavior.

NOOP

No Operation

Normal Charging

Under normal charging conditions, charging can take up to 8 hours. Cold or Hot charging can take up to 40 hours to fully recharge the battery. Hot charging is between 46-60°C (or 114.8-140°F). Anything above that will cause the battery not to charge. Cold charging is between 0-10°C (or 32-50°F). Anything lower will cause the battery not to charge. Normal charging takes place between 11-45°C (or 51.8-113°F). **NOTE:** Temperature ranges are for the battery itself and not ambient temperature.

NTP - Network Time Protocol (obtain clock from web-based server)

For clock synchronization between computer systems over packet-switched, variable latency data networks.

Non-Volatile RAM - Non-Volatile Random Access Memory (NVRAM)

A category of Random Access Memory (RAM) that retains stored data even if the power is switched off.

Null Termination

To place a NULL character (character code 0) at the end of ASCII data. Some functions require NULL Termination to be able to determine the end point of the ASCII data since that data may vary in length from one time to the next.

O

OCS - Operator Control Station

This is the acronym assigned to a line of products from Horner APG. Horner APG OCS products contain Logic processing capabilities, I/O, and communications in a single, compact package, as well as graphic displays and touchscreens in most cases.

OEM Code - Original Equipment Manufacturer

Cscape allows user-defined sections of ladder Program Code to be marked as "Original Equipment Manufacturer" (OEM) or "proprietary". Code thus marked can be accessed only by a user with the proper security permissions and password.

Onboard

To reside on the device itself as opposed to being an add-on module.

OS

Acronym for Operating System

P

Packet

Describes a small quantity of data sent over a network (i.e. LAN or the Internet).

Parent Directory

With a directory, a **parent directory** is a directory that contains the current directory. **Root directory** is the "highest" directory in this hierarchy.

Parity Bit

An additional non-data bit attached to a binary word to provide a check of the data integrity by making the sum of the number of ones in a word always even or odd.

Pass Through

A feature of Horner APG's OCS products is to connect Cscape "local", aka directly, to an OCS, then do pass-through programming and monitoring to other "target" OCS controllers connected via CsCAN.

Path

In communication, a path is a link between two nodes in a network. May also refer to the location of a file or folder, such as on a microSD card or USB drive.

PDU - Protocol Data Unit

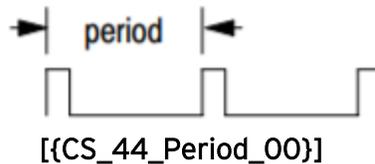
A PDU is a specific block of information transferred over a network.

Peer-to-Peer Communication

1. A form of communication in which messages are exchanged between entities having equal access to the medium.
2. Contrasted with Master/Slave Communication.

Period

The length of time for a cyclical operation to complete one full cycle.

**PID**

Refer to Proportional Integral Derivative

Pin-outs or pinout

A pinout is a reference to the pins or contacts that connect an electrical device or connector. It describes the functions of transmitted signals and the circuit input/output (I/O) requirements. Each individual pin in a chip, connector or singular wire is defined in text, a table, or a diagram.

Ping

A network diagnostic tool used primarily to test the connectivity between two nodes or devices. To ping a destination node, an Internet Control Message Protocol (ICMP) echo request packet is sent to that node. If a connection is available, the destination node responds with an echo reply. Ping calculates the round-trip time of the data packet's route from its source to the destination and back and determines whether any packets were lost during the trip.

PLCs - Programmable Logic Controllers

An industrial computer control system that continuously monitors the state of input devices and makes decisions based upon a custom program to control the state of output devices.

Polled

When a device is consistently asked for data, either as fast as possible or on a time basis. Normally associated with Modbus communications. See also Triggered.

Polarity

The orientation of voltage or current. For example, the polarity of the power connection on an OCS is the positive voltage source (24VDC) goes to the "+" input and ground (0VDC) goes to the "-" input. If these were flipped, it would be Reverse Polarity.

Port

1. Electrical - A place to plug in a means of communication, i.e. Serial Port or Ethernet Port.
2. Mechanical - An opening in an enclosure, housing, or block.
3. Ethernet - The means through which a specific message is identified when going through a device such as a router.

Power cycle

To turn off and on

Power Supply

A device that converts available power to a form that a system can use, usually converts AC power to DC power.

Preload (load)

A special function used to trigger loading of a value into a register/variable upon an event. (Not used with Frequency or Period Measurement.) When the pre-load function is active, it will take the value from the "Preload" register/variable and put it into the "Accumulator" for the corresponding Counter. Normally associated with High Speed Counter accumulators.

Process Variable aka PV

The current actual value of a process -- temperature, pressure, flow rate, etc.

Producer

A device that transmits data.

Proportional, Integral, Derivative Control (PID)

An intelligent I/O module or program instruction providing automation closed-loop operation of process control loops. For each loop, this module or instruction can perform proportional control and optionally integral control, derivative control, or both.

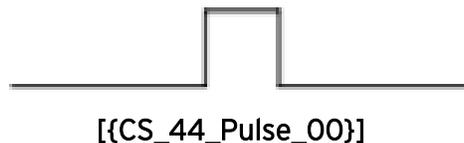
- **Proportional Control** - Causes an output signal to change as a direct ratio of the error signal variation.
- **Integral Control** - Causes an output signal to change as a function of the integral or the error signal over the time duration.
- **Derivative Control** - Causes an output signal to change as a function of the rate or change of the error signal.

Protocol

A protocol is a standard set of rules that allow electronic devices to communicate with each other. These rules include what type of data may be transmitted, what commands are used to send and receive data, and how data transfers are confirmed.

Pulse

A momentary sharp change in voltage, current, or light from its quiescent condition.

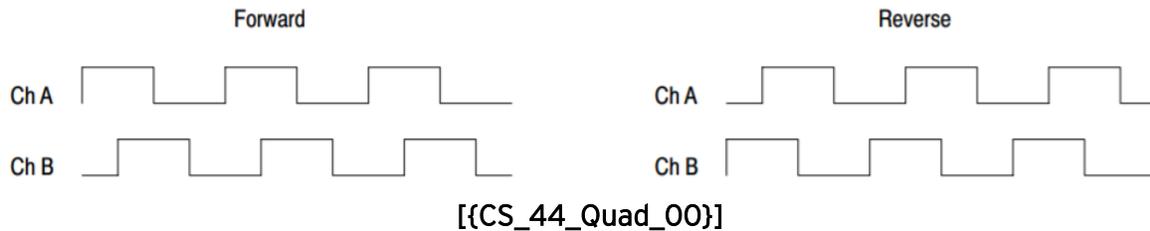
**Pulse Width Modulation (PWM)**

A technique for generating a DC voltage level from a higher constant DC voltage. The constant input voltage is chopped to produce pulses at a constant period and constant amplitude. Modulating the pulse width (duration) controls the average voltage of the output. See Duty Cycle.

Q

Quadrature

Separation in phase by two pulses of 90°. Used on signal channel of feedback devices to detect the direction of motion.



R

Read/Write Memory

A memory where data can be stored (write mode) or access (read mode). The write mode replaces previously stored data with current data; the read mode does not alter stored data.

Real Time

Having to do with the actual time during which physical events take place.

Register

A spot on the controller memory where data may be stored. When using Horner Advance Ladder Logic, it is required to track register usage to ensure no overwriting of existing data or functions. With tag-based editing, registers are no longer used for the most part, replaced with variables.

Relay

An electrically operated switch.

Remote Controller

A controller that is connected to Cscape through the CsCAN port of the local controller.

Remote I/O

I/O connected to the main controller across a network link.

Remote Node

An OCS or device that is remote compared to the local device. May be referred to as "Target" in Cscape if Cscape is connected "Local" to a different controller on the CsCAN and is pass-through programming this remote node.

RM - Removable Media

A type of external storage device. (Ex: microSD card or USB flash drive.)

Repeaters

A device that amplifies or adds to incoming electrical signals and retransmits them, in order to compensate for transmission losses. Repeaters can be used to add additional nodes and/or distance to the network and protect the signal against noisy environments.

Resistive Load

Typically used to convert current into forms of energy such as heat. Unlike inductive loads, resistive loads generate no magnetic fields.

Restore

The process of recovering lost or old data from a backup.

Retentive

Registers or variables are retentive if their data remains unchanged after a RUN/STOP sequence, or after a Power Down / Power Up sequence.

RJ-45 - Registered Jack-45

A common misnomer of the 8-pin modular jack (8P8C) used for Ethernet is RJ-45. Official RJ-45 jacks are keyed. Regardless, RJ-45 is the widely accepted name for an Ethernet jack. In addition to Ethernet, OCS products may use 8-pin modular jacks for Serial ports (MJ1, MJ2, MJ3) and CAN ports.

Root Directory

With a directory, a parent directory is a directory that contains the current directory. Root directory is the "highest" directory in this hierarchy. See also Child and Parent directory.

Router

The router forwards data packets along networks. It is connected to at least two networks, commonly two LANs or WANs or a LAN and its ISP's network. Routers are located at gateways, the places where two or more networks connect. Routers use headers and forwarding tables to determine the best path for forwarding the packets, and they use protocols to communicate with each other and configure the best route between any two hosts.

RS-485

An EIA standard that specifies electrical characteristics of drivers and receivers for use in serial communications. Electrical signaling is balanced and multipoint systems are supported.

RTD - Resistance Temperature Detector

A resistor for which the electrical resistivity is a known function of the temperature.

RTU - Remote Terminal Unit

A microprocessor-based device that monitors and controls field devices, that then connects to plant control or SCADA (supervisory control and data acquisition) systems.

RUN Mode

An operational mode for the attached controller. In this mode, the controller is fully operational - I/O points are being "scanned" and the ladder logic program is being executed.

RUN mode is indicated in Cscape with the green traffic light. It is indicated on the controller with a solid RUN indicator.

S

SCADA - Supervisory Control and Data Acquisition

Normally a software package running on a PC that monitors data from a controller or group of controllers.

Scaling

The process of changing a quantity from one notation to another.

Scan Time

Time required for the controller to read its inputs, solve the Ladder Logic program, and write its outputs. Scan times are usually expressed in milliseconds.

NOTE: Scan times can vary, depending on number and complexity of Ladder Logic rungs that are active during the "solve" portion of the scan.

Scan List

A list of communications to carry out to one or more devices. Normally, the Master or Client device will execute this scan list, which is directed at Slave or Server devices. Scan List items may be Polled or Triggered.

Sequential Function Chart

One of five programming languages of the IEC61131 programming standard. See also Structured Text, Ladder Diagram, Instruction List, or Function Block Diagram.

Serial Communication

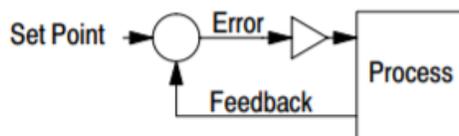
A communication method that uses one or two transmission lines to send and receive data, and that data is continuously sent and received one bit at a time.

Server

A computer that provides data to other computers. It may serve data to systems on a local area network (LAN) or a wide area network (WAN) over the Internet.

Setpoint aka SP

In a feedback control loop, the commanded value of the variable being controlled.



[[CS_44_Set_00]]

Shield

A conductive barrier that reduced the effect of external electrostatic and electromagnetic fields.

Short Integer [Data Type **SINT**]

An 8-bit signed value. Short Integers are used where the value of the data is expected to be in the range of -128 to +127.

Sigma-Delta

The type of architecture used in an A/D converter that combines oversampling, noise-shaping, digital filtering, and decimation. The analog input signal is continuously samples at a rate determined by a master clock and a selected gain. A charge-balancing A/D converter (sigma-delta modulator) converts the sampled signal into a digital pulse train with a duty cycle that represents the digital value.

Signal

The even or electrical quantity that conveys information from one point to another.

Slave / Master

See Master/Slave

Sink Load

A load with a current in the direction of its input. A sink load must be driven by a current sink. (Contrasted with Source Load)

Sink Output

An output that, when turned on, supplies a negative DC current to its load. (Contrasted with Source Output)

SMS File

Acronym for Short Messaging Service File

SMTP - Simple Mail Transfer Protocol

A method to transfer mail from one user to another. SMTP is a push protocol and is used to send the mail whereas POP (post office protocol) or IMAP (internet message access protocol) are used to retrieve those mails at the receiver's side.

Soft key / Hard Key

"Soft Key" refers to buttons whose function changes depending on the context. They typically use part of the display to identify their current function. Conversely, "Hard Keys" have the same function no matter the context.

Solenoid

Cylindrical coil of wire acting as a magnet when carrying electric current.

Solid-State Digital Outputs

Generally used to activate lamps, low voltage solenoids, relays, and other low voltage and low current devices.

Source Load

A load with a current in the direction into its input. A source load must be driven by a current source. (Contrasted with Sink Load)

Source Output

An output, that when turned on, supplies a positive DC current to its load. (Contrasted with Sink Output)

Sourcing

In positive logic mode, a positive voltage applied to the input will turn the input. The internal design of this mode is basically a resistor from the input to I/O ground.

SRTP - Service Request Transfer Protocol

A GE Fanuc Automation protocol, which allows a remote SRTP Client to request services from an SRTP Server.

Static

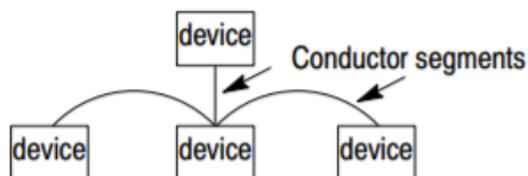
Generally, refers to elements of the Internet or computer programming that are fixed and not capable of action or change. (Opposite of **Dynamic**)

Steady State

A steady-state response is the behavior of a circuit after a long time when steady conditions have been reached after an external excitation.

Star Configuration (for parallel connection)

In an arrange of parallel (bus) connections, a physical configuration such that each device is connected on the bus at the same junction of conductor segments. (Contrasted with Daisy Chain or Trunk-line/Drop-line configuration)



[[CS_44_Star_00]]

Start / Stop bits

The beginning and ending bits in a data frame or packet - The start bit is used to signal the beginning of a frame. The stop bit is used to signal the end of a frame.

State

1. The condition of a circuit or system.
2. The condition at the output of a circuit that represents logic 0 or 1.

Step Function

A signal that has a zero (0) value before a certain instant of time and a constant nonzero value immediate after that instant.



[CS_44_Step_00]

STP - Shielded Twisted Pair

Synonymous with Shielded Foil Twisted Pair (SFTP), STP is a copper cable configuration comprising a metallic foil shield that surrounds each insulated pair, of which there may be several. An uninsulated steel or tinned copper conductor in contact with each inner shield serves as a drain wire, ensuring that the continuity of the shield remains intact if the foil is broken or cracked.

Stream

Digital data (such as audio or video material) that is continuously delivered one packet at a time and is usually intended for immediate processing or playback in real time.

String - [Data Type STRING]

A variable-length succession of characters. Each character is represented by one byte.

- a. **Cscape strings** are delimited by the Single Quote character (').
- b. **Cscape strings** may be zero characters in length.

Structured Text

One of five programming languages of the IEC61131 programming standard. See also Sequential Function Chart, Ladder Diagram, Instruction List, or Function Block Diagram.

Synchronous

In step or in phase, as applied to two or more circuits, devices, or machines. Contrasted with Asynchronous.

T

Tachometer

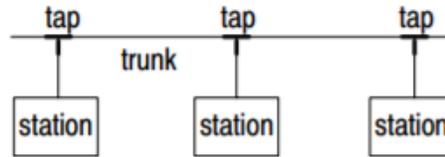
A precision linear DC generator used to provide velocity feedback.

Tag Name

An alphanumeric string assigned to represent a specific I/O point. Sometimes called an **alias**.

Tap

A connection to a trunk cable. The tap allows part of the signal on the truck to be passed to a station, and the signal transmitted by the station to be passed to the trunk.



[[CS_44_Tap_00]]

Target

The Target controller is the controller that the user wishes to communicate with. The user may obtain the unit's status, upload programs, download programs, or debug the associated program "live" in real time.

TCP - Transmission Control Protocol

A standard that defines how to establish and maintain a network conversation through which application programs can exchange data.

TCP/IP - Transmission Control Protocol / Internet Protocol

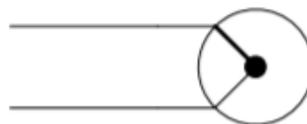
A transport layer protocol and a network layer protocol developed by the Department of Defense. This is a commonly used combination for communication within networks and across internetwork.

Termination

A load connected to the end of a transmission line. To avoid signal reflections, it must match the characteristic impedance of the line.

Thermocouple

A sensor used to measure temperature. Thermocouples consist of two wire legs made from different metals. The wires legs are welded together at one end, creating a junction. This junction is where the temperature is measured. When the junction experiences a change in temperature, a voltage is created. The voltage can then be interpreted using thermocouple reference tables to calculate the temperature.



[[CS_44_TC_00]]

Thermistor - Thermally Sensitive Resistors

Thermistors are a type of semiconductor, meaning they have greater resistance than conducting materials, yet lower resistance than insulating materials. Thermistors are available in two types: those with Negative Temperature Coefficients (NTC thermistors) and those with Positive Temperature Coefficients (PTC thermistors).

Timeout

Specifies the amount of time for a device to wait for a valid response.

Topology

The way a network is physically structured, such as a bus or star configuration.

Torque

A turning force applied to a shaft, tending to cause rotation. Torque is equal to the force applied, times the radius through which it acts.

Totalizer

A counter that sums the total number of cycles applied to its input.

Transducer

A device that converts variations in a physical quantity, such as pressure or brightness, into an electrical signal, or vice versa.

Transflective

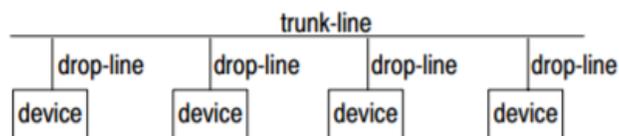
Combines the words TRANSMISSIVE and REFLECTIVE. A transflective LCD combines the best features of both reflective LCDs and transmissive LCDs.

Triggered

Communications to a device infrequently or inconsistently, such as when an operator must press a button for the data transfer to be initiated. See also Polled.

Trunk-line / Drop-line Configuration

For parallel connection - In a linear arrangement of parallel (bus) connections, a physical configuration such as each device is connected to the bus at the end of a drop-line that is connected to a tap at the junction of two trunk-line segments. (Contrasted with Daisy-Chain or Star Configurations.)



[{CS_44_Trunk_00}]

TTF Files

A font file format created by Apple but used on both Macintosh and Windows platforms. It can be resized to any size without losing quality and looks the same when printed as it does on the screen.

U

UDP - User Datagram Protocol

An alternative communications protocol to Transmission Control Protocol (TCP) used primarily for establishing low-latency and loss-tolerating connections between applications on the internet.

UL - Underwriters Laboratories

Third party safety certification organization.

Unsigned Double Integer - [Data Type UDINT]

A 32-bit unsigned value. Unsigned Double Integers are used where the value of the data is expected to be in the range of 0 (zero) to 4,294,967,296.

Unsigned Integer - [Data Type UINT]

A 16-bit unsigned value. Unsigned Integers are used where the value of the data is expected to be in the range of -0 (zero) to 65,535.

Unsigned Short Integer - [Data Type USINT]

An 8-bit unsigned value. Unsigned Short Integers are used where the value of the data is expected to be in the range of 0 (zero) to 255.

Update Time

1. For analog inputs, the time between updates to the memory in the analog module of the digital value representing the analog input signal.
2. For analog outputs, the time from the digital value being received at the analog module to when the analog output signal corresponds to that digital value.

Update Timeout

A value (in milliseconds) that specifies how long a Consumer will wait to receive an Exchange, before considering it late.

URL - Uniform Resource Locator

Normally associated with PID functions. The Upper and Lower Clamp values impose limitations on the PID Control Variable in how high or how low it is allowed to go in order to match the Setpoint.

USB Isolator

This compact, industrial-grade **isolator** provides a high-voltage isolation barrier between a computer and a connected **USB** device. The isolation protects equipment from electrical surges and transient voltage spikes.

V

Vector

A quantity that denotes both magnitude and direction. Vectors are commonly represented by a line segment with an arrow; the length represents the magnitude; the orientation in space and the placement of the arrow at one end of the line represents the direction.



[[CS_44_Vector_00]]

Volatile RAM

Volatile memory is computer storage that only maintains its data while the device is powered.

Voltage Drop

The power drop, or power lost in a cable, depends on the cable length, cable size and the current through the cable. Larger cables have less resistance and can therefore transmit more power without large losses. Losses in smaller cables remain low if the amount of power transmitted is small, or if the cable is not very long.

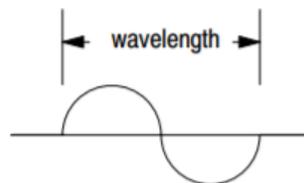
W

Watchdog Timer

A timer that monitors a cyclical process and is cleared at the conclusion of each cycle. If the watchdog runs past its programmed period, it will cause a fault. For OCS controllers, the cycle monitored is the controller scan. The scan must complete within several hundred milliseconds or the watchdog timer trips, resetting the controller.

Wavelength

The distance traveled by light (or other radiation) while completely on complete sine-wave cycle. It is expressed in nanometers (nm). Each color has a specific wavelength.



[[CS_44_Wave_00]]

WebMI - Web-Machine Interface

An HTML5-based HTTP server, where access to data and visualizations is enabled from anywhere via web clients. WebMI empowers users to control everything onscreen from a computer, tablet, or other mobile device.

Word - [Data Type WORD]

A string of 16 consecutive bits. WORD values are used where the value of the data is not as important as the bit patterns (shifts and rotates).