Fisher-Rosemount Systems

PROVOX® Process Management System Master Glossary

This manual defines terms used in PROVOX documentation to date. From time to time, the glossary is updated to add new terms.

Technical Reference
TR4.0:PROVOX
Revision A — April 1997
This manual supercedes the issue dated March 1991.

D2R01481002

Fisher-Rosemount Systems

FISHER·ROSEMOUNT

Printed in USA

Your Evaluation Please . . .

Name:	Title and Department:
Company:	Years of Experience: ___ Instrumentation ___ Distributed Control
Telephone: ( ) -	Education: ____High School ____Years College ____Degree
Job Responsibility:	

Please indicate your evaluation of *TR4.0:PROVOX (Revision A — April 1997)*. Attach extra sheets if needed.

1. How and when do you use this manual?

- ☐ Read entire manual before attempting task
- ☐ Read selected sections before attempting task
- ☐ Read while attempting task
- ☐ Attempt task first
- ☐ Read as last resort

2. How well is the manual's content *organized*? Please explain.

- ☐ **Excellent** — parallels product's operation, very usable
- ☐ **Good** — representative of the product's operation, usable
- ☐ **Average** — usable but can be improved
- ☐ **Fair** — not very usable, should be improved
- ☐ **Poor** — not usable, must be improved
- ☐ **No Opinion**

3. Is the manual's content *understandable* and *applicable* to the product's operation? Please explain.

Understandable	Applicable	
☐	☐	**Excellent** — very easy to understand, very applicable
☐	☐	**Good** — easy to understand, applicable
☐	☐	**Average** — applicable but some sections not easy to understand
☐	☐	**Fair** — not very understandable/applicable, should be improved
☐	☐	**Poor** — not understandable/applicable, must be improved
☐	☐	**No Opinion**

4. How well do the manual's *illustrations* convey product information? Please explain.

- ☐ **Excellent** — very easy to understand, extremely usable
- ☐ **Good** — easy to understand, very usable
- ☐ **Average** — fairly easy to understand, usable
- ☐ **Fair** — not easy to understand, should be improved, not very usable
- ☐ **Poor** — cannot understand, must be improved, totally unusable
- ☐ **No Opinion**

5. Describe the *amount* of usable information in this manual including tables. Please explain.

- ☐ **Too much information** — not all required to perform task
- ☐ **Proper amount provided** — not too much nor too little
- ☐ **Too little information** — needed additional information to perform task
- ☐ **No Opinion**

Sections **Index**

6. How well is information *cross-referenced* in the manual's individual sections and index? Please explain.

Sections	Index	
☐	☐	**Excellent** — very easy to locate information, extremely usable
☐	☐	**Good** — easy to locate information, very usable
☐	☐	**Average** — fairly easy to locate information, usable
☐	☐	**Fair** — not easy to locate information, should be improved, not very usable
☐	☐	**Poor** — cannot locate information, must be improved, totally unusable
☐	☐	**Did Not Use**
☐	☐	**No Opinion**

7. How *useful* is the Glossary?

- ☐ **Useful**
- ☐ **Useful but not complete/accurate**
- ☐ **Not Useful**
- ☐ **Did Not Use**
- ☐ **No Opinion**

8. What is your *overall impression* of this manual? Please explain.

- ☐ **Excellent** — met all needs, extremely usable
- ☐ **Good** — met most of my needs, very usable
- ☐ **Average** — usable
- ☐ **Fair** — should be revised, not very usable
- ☐ **Poor** — must be revised, totally unusable
- ☐ **No Opinion**

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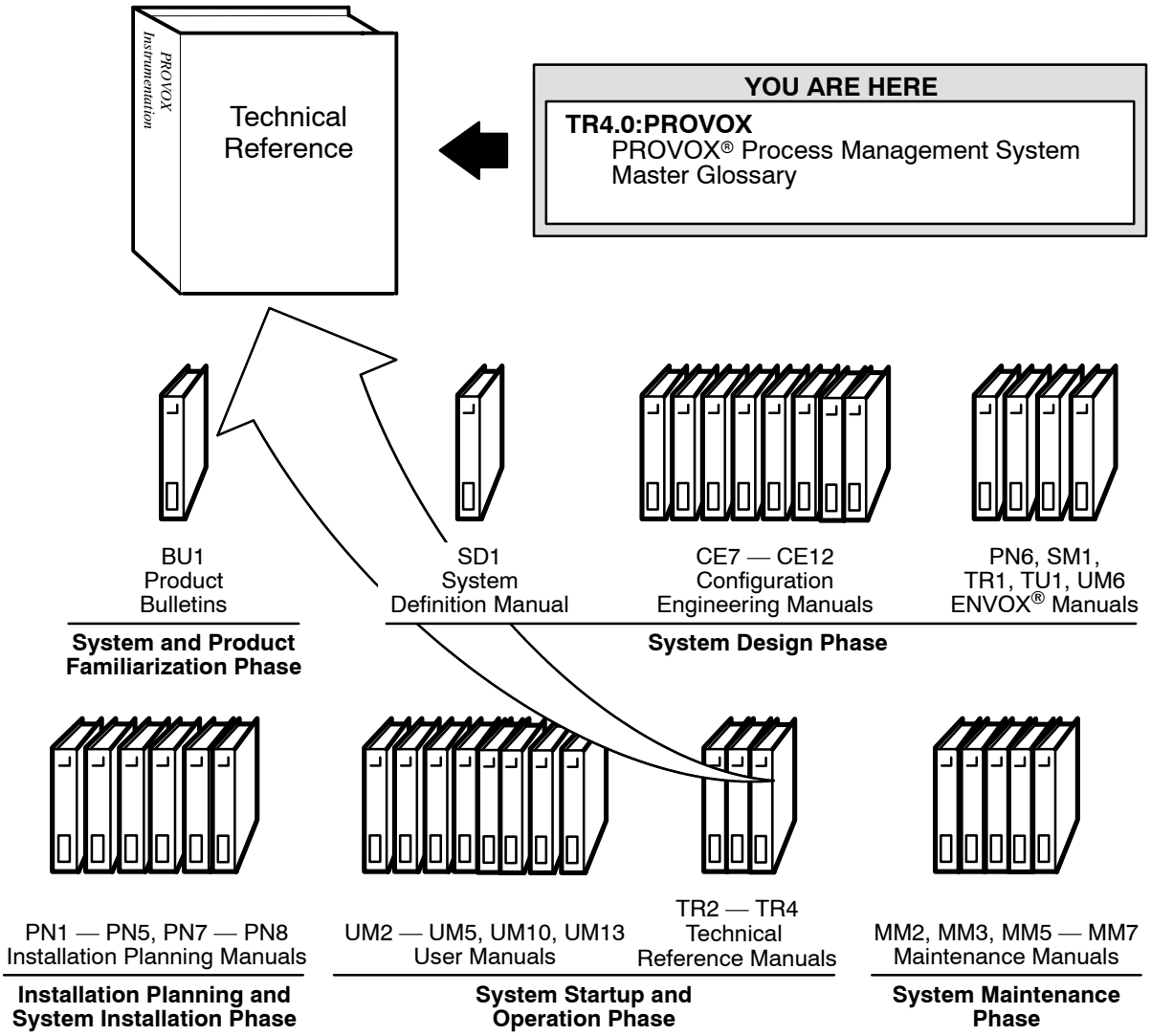
Documentation Map

PROVOX® Library

This map shows the location of the Master Glossary in the documentation catalog set for PROVOX products. The number, title, and binder location are shown for each document, identifying where specific information is located. See the descriptions on the back of this map for more information. Appendix A lists additional related documentation.



PROVOX® documentation supports each stage of system development.

System Development Stages	Document Type & Contents
System Design	*Configuration Engineering Manuals* Configuration data-entry help for a product, including theory of operation for improved product use. *User Manual for Configuration Products* Operating methods and procedures for using the configuration software. *Technical Reference Manuals* Advanced user information for expanding the capability of the PROVOX system.
System Planning and Installation	*Installation Planning Manuals* Site preparation, including the environment, power, and grounding. Also, product input/output signal wiring, cable connections, and software installation.
System Startup and Operation	*User Manuals* Operating methods and procedures for a product. *Tutorials* Structured training for operators.
Maintenance	*Maintenance Manuals* Preventative maintenance, calibration, troubleshooting, and repair procedures.

Ordering Information — To order additional manuals, contact your local sales representative, specifying the number, title, and quantity of each document required.

Contents

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Fisher-Rosemount Systems

Section Tab Guide

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1 Introduction

This document lists terms, definitions, acronyms, and abbreviations used in describing products associated with PROVOX® Process Management systems.

1.1 Intended Audience

This manual is intended as a reference for persons who install, engineer, use, and maintain the Fisher-Rosemount Systems line of PROVOX Process Management products.

1.2 Structure of this Manual

This manual contains the following sections and appendixes:

Section 1 — Introduction: includes an overview of this manual, as well as the intended audience and the stylistic and typographical conventions used.

Section 2 — Master Glossary of Terms and Symbols: provides an alphabetical listing of all PROVOX terms, acronyms, and abbreviations and their definitions.

Section 3 — Acronym and Abbreviation List: provides an alphabetical listing of all PROVOX acronyms and abbreviations.

Appendix A — Bibliography: provides an alphabetical listing of all PROVOX documents used in developing the Glossary.

Note

If you prefer to access this reference document online, it is available in the latest version of DOCVUE.

1.3 Manual Conventions

This manual uses the following conventions:

- **Revision Control** — The title page lists the printing date of this manual. The versions of the product this manual covers are listed in Appendix A.
- **References** — References to other documents include the name (and catalog number) for Fisher-Rosemount Systems manuals.

1.4 Where to Find Answers About This Product or Manual

Fisher-Rosemount Systems' goal is to provide products and documentation that exceed your needs. If you have questions or comments about this product or manual, please contact your Fisher-Rosemount Systems representative or sales office.

To help us evaluate how well this manual fills your needs, please complete and send in the evaluation form located in the front of this manual. We also appreciate your suggestions on ways to improve any page of the manual. Please mark your suggestions on a copy of the page and include it with the evaluation form. Thank you for providing this information.

2 Master Glossary of Terms and Symbols

This master glossary contains the definitions of terms, acronyms, abbreviations, and symbols that you find in PROVOX® Process Management System documentation. Periodically, the glossary is revised to add terms that are defined as PROVOX system enhancements are released. Some entries are taken from industry standards, others have been defined by the product development and support teams within Fisher-Rosemount Systems.

If you find that additional definitions would help, please use the attached reader evaluation form to notify us. We are glad to add in future revisions of this glossary useful terms which are helpful to PROVOX system users.

Symbols

e
Symbol: Error.

Δe
Symbol: Change in error.

I/P
Symbol: Current to Pneumatic Transducer

K
Symbol: Fixed Gain

Δu
Symbol: Change in output.

S_e
Symbol: Error scaling factor.

$S_{\Delta e}$
Symbol: Change-in-error scaling factor.

$S_{\Delta u}$
Symbol: Change-in-output scaling factor.

XFR
Symbol: Transfer

XMIT
Symbol: Transmit

%IVP
Symbol: Percent Implied Valve Position

%RNG
Abbreviation: Percent of Range (used on controller point faceplates).

Terms

@aGlance/IT
An Intuitive Technology Corporation software product that enables third-party client/server software development.

ABINT
Acronym: Allen-Bradley Interface

abort
Operator request to discontinue a procedure (recipe). Abort does not stop the operation the controller is currently running. An aborted procedure cannot be RETRYed.

absolute alarm
An alarm which is triggered when the signal that is being monitored reaches an absolute level, as opposed to a level which is relative to another value. High Alarms and Low Alarms are types of absolute alarms.

See *Deviation Alarm*.

absolute time
A specific date and time of day. Absolute time is entered and displayed using the HH:MM:SS DD–MMM–YYYY format. START and END Times may be entered as absolute times.

AC or ac
Acronym: Alternating Current

ac^2
An acronym for *analog control center* and a formerly-manufactured family of analog control instruments of Fisher Controls.

ACADCDV
In the Graphics Toolkit software, a DOS batch file or Windows interface button that automates the conversion of display drawings from Auto XCCAD DWG files to CDV files. The conversion creates DXF and PDF files as well.

ACADPDF
In the Graphics Toolkit software, a DOS batch file that automates the conversion of display drawings from AutoCAD DWG files to PDF files. The conversion creates DXF files as well.

ACADUDF
In the Graphics Toolkit software, a DOS batch file that automates the conversion of display drawings from AutoCAD DWG files to UDF files.

accelerator
A key, or sequence or combination of keys, used as a shortcut to access a program function.

access unit interface (AUI)
An optional interface that permits transparent connection of a data station to either a baseband or broadband local area network.

accumulation
A PROVOX® point type; specifically a role for a multivariable point. An accumulation point keeps running totals of selected point attributes.

accumulator
A register or other memory location that temporarily holds the result of a calculation or logic operation.

ACIA
Acronym: Asynchronous Communications Interface Adapter

ACK
Abbreviation: Acknowledge

acknowledge (ACK)
To respond to an alarm or other indicator of an unusual condition. Operators of PROVOX® systems can acknowledge alarms themselves. Optionally, in many situations, the system can acknowledge alarms automatically.

ACQ
Abbreviation: Acquire

acquire
The act of gaining control of a piece of equipment needed in a recipe.

acquire set
A list of unit point tags that a recipe references during execution. The unit points in the acquire set depend on which units are available when the recipe executes.

ACS
Acronym: Advanced Control Solutions

ACT
Abbreviation: Active

active process indicator
In the ENSTRUCT software: the unit variable that stores a number indicating the current active step. This variable is intended to interface to the Batchometer on the graphic display. The location of this variable is UV 24 of a batch unit.

activity
1. A named procedure that the control system activates during one or more named batch cycles. For example, if batch cycle BATCH 1 activates procedure PRODUCT A, PRODUCT A is an activity of that batch cycle.

2. A point type available in certain PROVOX® consoles or other devices. Activity points schedule and monitor procedures.

activity point
A console point that provides a structure for running recipes and for communicating with the operator.

actual valve pressure/position (AVP)
The FIELDVUE® shadow AO point allows an actual valve position or actual pressure feedback signal (AVP) to be sent to the console. AVP data are also available on loop points configured with the output F-C-C as the primary variable of a Smart Device Output Card. The AVP attribute is a single occurrence and is used to display the AVP value on a custom display, unsolicited.

See *FIELDVUE Shadow AO Point*.

A/D
Acronym: Analog-to-Digital, or Analog to Digital Converter

adaptive control
A control technique that involves automatic change of control parameter values to improve the performance of the control system.

adaptive gain

1. A type of primary control algorithm which allows the proportional gain to change based on the value of an analog signal, a discrete signal, the process variable, the implied valve position, or the process error. (The process error is the difference between the PV and SP values.)

2. A characteristic of a controller in which one or more of its tuning parameters are automatically adjusted to compensate for process non-linearities. The parameters may be adjusted based on predictable changes in operating conditions (gain scheduling) or in response to unpredictable process changes (continuous adaptation).

adaptive learning rate

A learning rate that is adapted at each epoch to achieve fast learning. The Intelligent Sensor Toolkit has an adaptive learning rate.

ADC

Acronym: Analog to Digital Converter

address

1. One or more integers arranged to identify the location of a device or logical unit of an instrumentation system. In PROVOX® systems, address values identify such things as data highway, device, file, card, and channel.

2. A number used by the computer operating system and software to identify a storage location in memory or on a storage device such as a disk.

3. A unique address value associated with a given device on the PROVUE® data highway or on an Ethernet circuit.

ADLC

Acronym: Advanced Data Link Control

ADR

Acronym: Advanced Data Reporting

Advanced Control Solutions

Fisher-Rosemount System's family of special-application software that optimizes process control solutions.

advanced user interface (AUI)

A feature of some graphics drivers that allows the display of pull-menus, icon menus, and dialogue boxes in AutoCAD applications.

advanced user interface menu

The menu bar that appears above the drawing area in AutoCAD applications.

AEUP

Acronym: Auxiliary Engineering Unit Pair

AFC

Acronym: Advanced Flow Control

AFP

Acronym: Auxiliary Function Parameter

AI

1. Acronym: Analog Input

2. Acronym: Artificial Intelligence

AIN

Acronym: Analog Input/Output

AIO

Acronym: Analog Input/Output

AIU

Acronym: Alarm Interface Unit

AIX

1. Acronym: Advanced Interactive eXecutive

2. The IBM version of the UNIX operating system on an RS/6000 computer.

alarm (ALM)
1. A console indicator of an unusual condition.

2. An area on the Operator Workstation (OWP) console's main window.

3. Part of a process control strategy developed for a collection of equipment.

alarm banner
In an RS3® system, the line of information that appears at the bottom of the screen when an alarm occurs and the console is in alarm banner mode.

alarm banner mode
In an RS3 system, an alarm display mode that presents the alarm banner of the unacknowledged alarm with the highest priority. Contrasts with alarm summary mode.

alarm deadband
The amount by which the PV value must return within normal limits for the system to clear an alarm. (For example, if the system activates an alarm as soon as the PV value exceeds 100 percent, but the deadband is 5 percent, the system would not clear the alarm until the PV value drops to 95 percent.)

alarm trip point
The user-defined value at which the system activates an alarm. Such activation occurs as the measured variable moves out of range (for example, going below the trip point for a low alarm).

alert
1. A flag similar to an alarm available only on Smart Device Output Card channels. Loop points support alerts configured with output F-C-C as the primary variable of a Smart Device Output Card channel.

2. A display attribute with eight occurrences accessed by using the DEVSTAT instruction in an FST step. Each occurrence shows the value of one alert bit in the upper byte (bits 8–15).

See *DEVSTAT* and *Function Sequence Table (FST)*.

algorithm
A set of logical steps to solve a problem or accomplish a task. A computer program contains one or more algorithms. Many configurations of PROVOX® systems also contain algorithms, particularly in operations, procedures, and function sequence tables.

alias
A name that the configuration engineer assigns to an item in the Recipe Manager database that makes understanding the recipe easier for the recipe author. Aliases can be defined for units and operations.

aliased user name
A user may assume another's identity by aliasing to the other's name.

alias template
A set of names assigned to point types as part of a UOC configuration. Point types that are common to more than one unit point may be assigned generic names such as Pump or Outlet Valve. When a point type is defined in an alias template it can be referenced in a unit operation using its generic name instead of its actual point tag. This allows a user to write an operation which can run on multiple unit points.

ALM
Abbreviation: Alarm

alpha
The maximum probability of making a Type 1 Error.

See *Type 1 Error.*

alphanumeric
Consisting of letters or numbers.

alternating current (AC or ac)
A flow of electricity which cycles to maximum in one direction, decreases to zero, then reverses itself and reaches maximum in the opposite direction, then increases again to zero.

alternative working directory (AWD)
A directory other than the directory where the program is located.

ALU
Acronym: Arithmetic Logic Unit

American National Standards Institute (ANSI)
A technical organization that develops standards for the compatibility of industrial equipment. This organization consists of users and manufacturers of such equipment.

American Standard Code for Information Interchange (ASCII)
1. A standard digital encoding scheme for data: a 7-bit binary code represents numbers, letters, symbols, and control codes.

2. A PROVOX® point type. An ASCII point contains a single real value, referenced by the setpoint attribute, and an 80-character ASCII string.

3. HART protocol uses a subset of ASCII, represented by only 6 bits. This subset includes numbers, upper-case letters, and common punctuation symbols. Lower-case and accentuated letters are not included. This subset reduces the length of text data items for improved transmission efficiency.

American Wire Gauge (AWG)
The usual system of wire size measurement in the United States. A 14 AWG wire has a cross-sectional area of *2.*08 mm; a 000 AWG wire has a cross-sectional area of 85.02 mm. Note that the smaller the AWG value, the larger the wire.

amplitude
The strength of a signal being sent by a highway device.

analog
Continuously variable over a given range. A process control system senses a physical variable such as voltage, current, or resistance as an analog value.

analog input (AI)
1. A continuously variable input (generally 4-to-20 mA).

2. A PROVOX® point type. An analog input point receives a single analog value, the process variable.

analog input (AIN) instruction
An AIN instruction in a FST step sets the percent signal value (SPV) output equal to the value at the address specified by the Input Location. The SVP output is in percent format, or zero if the card is bad.

See *Function Sequence Table (FST)*.

analog output (AO)
A PROVOX® point type. An analog output point generates a single analog value, the setpoint.

analog output (AOUT) instruction
An AOUT instruction in a FST step copies a percent-format value of the percent signal value (SVP) input to the specified address.

See *Function Sequence Table (FST)*.

analog/smart device input module
A module that must be installed on the Type CL6895/CL6896 Single-ended Analog/Smart Device Input Termination Panel for compatibility with the Type CL6821/CL6824 Analog I/O Cards (for analog inputs) or the Type CL6825 Smart Device Input Card (for smart analog, digital, or hybrid inputs). For smart inputs, a 250-ohm resistor (if installed) must also be removed from the termination panel.

analog to digital converter (A/D or ADC)
An integrated circuit device that converts analog signals into a digital form. This conversion enables a digital computer to operate on such signals.

analytical predictor
A control algorithm that achieves dead-time compensation.

annotation
Text the user can add to supplement the text provided with the on-line help system.

ANOVA
Abbreviation: Analysis of Variance

ANSI
Acronym: American National Standards Institute

anti-reset windup
An additional gain factor, applied to controllers to help them recover faster from output saturation, or windup.

AO
Acronym: Analog Output

AOUT
Acronym: Analog Output Instruction

.api file
A test file that contains the Intelligent Sensor Toolkit's predicted output values generated by a specific set of prefiltered and delayed process inputs.

application
1. The system, problem, or use to which a computer is applied.

2. A program that performs a task specific to a particular end-user's needs; generally a program that is not part of a basic operating system.

3. Software that is unique to a specific process control system or installation, rather than a general purpose or broad use.

application layer
A layer of the HART protocol that specifies the command set (Layer 7 of the Open Systems Interconnection [OSI] model).

application module
The hardware device that controls the licensing for the Operator Workplace Software.

2

application software library (ASL)
A library of low-level routines internal to Fisher-Rosemount System's application software products.

application window
The window containing the work area and menu bar for the Intelligent Sensor Toolkit program, or for another application. The application name appears at the top of this window. The application window can contain multiple *chart windows*.

APU
Acronym: Arithmetic Processing Unit

architecture
1. The arrangement and interconnection of the various parts of a microprocessor or computer system.

2. A description of a neural net indicating the number of layers, number of neurons in each layer, and the connections between neurons. The architecture might communicate what transfer function each neuron uses, but not usually the weights of each connection.

archive
A method to store recipes that are not currently used. Archived recipes can be restored to the current database.

archiving
Storing historical information pertaining to a tag number.

ARIMA
Abbreviation: Auto Regressive Integrated Moving Average

arithmetic logic unit (ALU)
A circuit component that performs complex mathematical calculations. In effect, an ALU is a very specialized MPU.

arithmetic processing unit (APU)
An electronic device that performs arithmetic calculations using hardware or logic functions, instead of a long series of computer instructions.

array
A computer or microprocessor variable for the storage of many values of the same type, with indices that permit access to values individually or in certain groups. Common arrays are one-dimensional (a simple row), two-dimensional (an arrangement of rows and columns), and three-dimensional (an arrangement of rows or columns along the x, y, and z axes). Some computer languages allow arrays that have more than three dimensions.

artificial intelligence (AI)
A group of related technologies developed to provide machines with human-like cognitive capabilities. The process control industry is exploiting three of these technologies, they are: Neural Networks, Expert Systems, and Fuzzy Logic.

artificial neural network
See *Neural Network*.

ARW
Acronym: Anti-Reset Windup

as-built tag
An as-built tag is a tag which represents the actual state of a physical device that resides in the plant. The most recent as-built tag is also known as the current as-built tag.

ASCII

1. Acronym: American Standard Code for Information Interchange

2. A standard digital encoding scheme for data: a 7-bit binary code represents numbers, letters, symbols, and control codes.

3. A PROVOX® point type. An ASCII point contains a single real value, referenced by the setpoint attribute, and an 80-character ASCII string.

ASE

Acronym: Automatic Switchover Enable

ASL

Acronym: Application Software Library

aspect ratio

The ratio of an image's height to its width.

assembler code/language

An early programming language. Later languages are more convenient than assembler for developing sophisticated software. Assembler still is important for some applications, primarily since this language permits direct manipulation of the system hardware. Assembler is normally used where speed or timing is critical.

assembly (ASSY)

In PROVOX® systems, a collection of hardware and/or PWB modules, or a single PWB module that is built up from individual components.

assignable causes (of variation)

Those causes of process variation that are not random but have some source that may be determined and eliminated.

ASSY

Abbreviation: Assembly

asynchronous communications interface adaptor (ACIA)

1. An integrated circuit that provides data formatting and control for serial asynchronous data communications. This adaptor provides an interface between an MPU data bus and external devices that have a serial data format.

2. In PROVOX® products, an integrated circuit that is used to interface regulatory controllers to DCUs.

asynchronous transmission

To recover information from a serial communication channel, the receiving device must identify the beginning and end of each bit and character in the data stream.

HART protocol uses asynchronous serial transmission. Timing is defined by a start bit (always 0) and a stop bit (always 1) before and after each character. Within a character, the bit timing is defined by the baud rate. Between characters, the HART protocol requires the idle time to be 1 byte time or less. HART protocol sends the least-significant bit first in each character.

attenuation

The reduction of signal strength as it travels on a cable.

ATTR

Abbreviation: Attribute

attribute (ATTR)

1. An individual parameter of a process control point.

2. The name of a PROVOX® data type. Points of some manufacturers usually have just one or two attributes, where points of PROVOX systems have many. Accordingly, each point of a PROVOX system commonly provides the control of four or five non-PROVOX system points.

attributes data
Qualitative data counted for recording and analysis. This data comes from yes/no or pass/fail determinations of whether the unit conforms to acceptable standards.

audit trail
A record of changes made to the ENVOX® database and to the system where the database resides. The record includes the type of change, when the change was made and who made it.

AUI
Acronym: Access Unit Interface

AUT or AUTO
Abbreviation: Automatic Mode

AutoBuilder
In the ENSTRUCT software: a compiled VMS utility that creates the project directory tree and converts table information directly into PROFLEX® or ENVOX® compatible files. This utility creates element controls, points, functions, and standard displays for configuration.

AutoBuilder is a trademark of Don H. Munger and Company, Inc.

AutoCAD
Computer Aided Design (CAD) package written by Autodesk, Inc. This package provides the heart of the Documentation Toolkit and Graphics Toolkit display editors.

auto correlation
Used to describe the correlation of a variable with itself at a different point in time. A typical random variable is perfectly correlated with itself at time (0) and approaches a minimum correlation as the time interval becomes large.

AutoLISP
A version of the LISP programming language supplied with AutoCAD software. The Graphics Toolkit software uses AutoLISP routines to control many AutoCAD functions within the display editor.

automatic mode (AUT or AUTO)
A loop or point control mode: the control algorithm changes the control output to minimize the difference between the values of the setpoint and the process variable. An operator supplies the setpoint value.

automatic switchover enable (ASE)
A redundant console switching procedure that the system software initiates automatically when it detects a failure in the active console of a redundant pair.

auto regressive integrated moving average
A moving average.

AUX
Abbreviation: Auxiliary

AUX EU
Acronym: Auxiliary Engineering Units

auxiliary engineering unit pair (AEUP)
Two values used to define the upper and lower limits of an auxiliary engineering unit range.

auxiliary engineering units (AUX EU)
The name (tag) of a set of engineering units which may be used by FST functions. Auxiliary engineering units are used when none of the standard DCP engineering units apply to the value being manipulated.

auxiliary function parameter (AFP)
A special tuning parameter for certain FST functions. An AFP appears on the detail display as a detail display parameter (DDP) for a direct control point (DCP).

average
The sum of values divided by the number of values: designated by a bar over the symbol for the values being averaged: for example, X-Bar is the average of the X values within a subgroup while X-Bar-Bar is the average of subgroup averages. The average is also described as the arithmetic mean.

AVP
Acronym: Actual Valve Pressure/Position

AWD
Acronym: Alternative Working Directory

AWG
Acronym: American Wire Gauge

AXP
Trademark of Digital Equipment Corporation for several lines of the firm's computers.

AX-S4
Fisher-Rosemount Systems' software to communicate between Windows PCs and RS3 systems. AX-S4 requires an RS232 link.

Baby N Connector
Obsolete variation of BNC.

backplane
A printed circuit board at the rear of the DC6460-Series Console Electronics Unit which, by means of its attached connectors, mates with the modular cards and assemblies installed in the card file.

back-propagation
A forward chaining, supervised learning neural network paradigm. This paradigm (also known as *back-prop* or *sigmoidal*) is one of the most popular and best understood paradigms for neural networks. This paradigm is the basis of our virtual sensor technology.

back up
Making copies of data stored on a diskette or hard disk so the data can be recovered after an accidental loss.

balancing point
Represents the mathematical center of geometric objects that have volume, area, or curves, for example. For the IFLC, the balancing point is calculated during retranslation to convert fuzzy values into absolute or numerical values. This concept is also known as the *center of gravity,* the *centroid,* or the *center of mass*.

bandwidth
1. The difference in hertz between the two boundaries of a frequency range.

2. The range of frequencies of a device, within which its performance of one or more characteristics conforms to a specified standard.

barrier
A partition to insolate or isolate electrical circuits or electric arcs.

base-band signalling
A type of network wiring that supports only one signal at a time.

Basic or BASIC
Beginner's All-purpose Symbolic Instruction Code: a high-level computer language used primarily in teaching and simple programming for business or engineering. BASIC was specifically designed to be easy to learn and simple to use.

basic data acquisition system (BDAS)
The portion of a PROVOX® console that requests and collects data from the various other devices in the system.

See *EDAS*.

basic statistical methods
Applies the theory of variation using basic problem solving techniques and statistical process control to generate and interpret control charts for capability analysis and process predictability.

batch
A specific quantity of a given product, produced in a single complete processing procedure.

batch console (BCON)
A formerly-manufactured PROVOX® console that provides a superset of custom console (CCON) functions, the capability to operate and configure UOCs, and additional capability for batch recipes.

batch control
A method of manufacturing a specific quantity of a product using a series of steps that are performed in a particular order.

batch control shell
The set of ENSTRUCT software FST and OPR (operation) mask files that are used to accomplish batch control functions. The batch control shell provides mask files for the following functions: batch operations, batch interlocking, concurrent control, and batch operation interface.

batch cycle
One iteration of a sophisticated processing procedure that produces a specific amount of a product. Batch processing usually involves repetition of the batch cycle over and over, producing batch after batch of product. Batch processing often involves variations of the procedure in each repetition of the batch cycle.

batch cycle control
The top level of the batch-control hierarchy. Batch cycle control encompasses the scheduling and accounting requirements of complex batch processes, with a plant-wide scope. This control also includes the sophisticated control and operator interface capabilities necessary for coordinating the use of plant equipment.

Batch Data Manager (BDM)
A PROVOX® software product that collects and manipulates data about batch product production. BDM graphically plots and processes data, and permits forward and backward genealogy tracking. BDM layers on CHIP software.

batch end report
The report printed at the completion of a batch that includes the recipe name, batch ID, the activity point and procedure that ran the batch, expected and actual values of grade parameters, and alarm and change-of-state messages.

batch formalism
A comprehensive method of control analysis that deals with the complex characteristics and special control considerations of batch and sequence control.

batch process actions
Actions performed by a unit on raw materials to produce a product. These actions are defined by the recipe and are separated into levels: processes, operations, phases, and control steps.

batch structure
The organization of equipment necessary to run a batch: serial, parallel, or concurrent.

baud
The unit of measurement of serial transmission speed for digital data. Baud usually means bits per second, but may have a different meaning if the encoding method used is frequency multiplexing.

baud rate
The standard transmission rates for sending or receiving binary coded data. Some systems code more than one data bit into each symbol.

HART protocol specifies a 1200 baud rate. Each symbol represents only one data bit, so the data rate is 1200 bits per second (bps), the same as the baud rate.

Bayonet Neil-Councelman Connector
A type of connector for a coaxial cable; used for Data Highway I of PROVOX® systems. This connector is also used in Control I/O Bus, UOC redundancy link, VDUs, and other PROVOX applications. Note: Origin of BNC acronym has been lost.

BCD
Acronym: Binary-Coded Decimal

BCOMP
Abbreviation: Batch Computer

A formerly manufactured PROVOX® product, the batch computer provided the functions of the custom computer (CCOMP) and also allowed the configuration and operation of the unit operations controller (UOC).

BCON
Acronym: Batch Console

BCU
Acronym: Backup Control Unit

BDAS
Acronym: Basic Data Acquisition System

BDM
Acronym: Batch Data Manager

begin time
The time represented by the left vertical axis of the plot area.

The *Begin Time* can be aligned with a sample in the historical data file permitting multiple traces with different sample times or rates to be aligned for comparison. Begin Times may be entered when adding a trace or by the Data Historian's ChangeTime function. Begin Times are increased or decreased using the Forward or Backward functions, respectively.

Bell 202
A U.S. telephone standard that uses 1200 Hz (as 1) and 2200 Hz (as 0) at 1200 baud. This full-duplex communication standard uses a different pair of frequencies for its reverse channel.

HART protocol uses Bell 202 signals, but is a half-duplex system so the reverse channel frequencies are not used.

B&G
Acronym: Bias and Gain

bias
A value added to a controller input or output, as part of a control strategy. For example, bias can determine the nominal setting of a control valve for a steady-state process.

bias and gain (B&G)
A type of primary control algorithm that accepts an input value, adds or subtracts a constant value, then multiplies the result by another constant value to establish an output value. The algorithm sends this output value to a field device. A bias and gain algorithm maintains a ratio between two variables of product production.

binary
1. A term applied to a signal or device that has only two discrete positions, states, characteristics, conditions, or possibilities. Most computers use binary representation of numbers and other data to match the on/off switching mechanism of most digital electronic circuits.

2. A number composed only of the digits 0 and 1, with successive digits from right to left representing multipliers for successive digits from right to left representing multipliers for successive powers of two. The number 2 is 10, the number 12 is 1100, and so on.

binary-coded decimal (BCD)
A digital encoding system for decimal numbers: a set of four binary digits represents each decimal digit, 0 through 9.

binary sort order
A sort order based upon the ASCII code of each character in a string.

bit (binary digit)
1. An abbreviation for binary digit, the smallest unit of information that a computer can recognize. A bit can represent a single item of yes/no information.

2. A single place in a binary number. The only possible values for a bit are 0 and *1.* Information can be coded into a number of bits for computer or communication purposes, such as ASCII code for alphanumeric characters or IEEE 754 code for floating point numbers.

bias neuron
The bias neuron always has a constant value of 1.0. This neuron is multiplied by weights, and the result is sent to the neurons of the following layer.

block
An AutoCAD term for a graphic or informational data component; a set of entities grouped together into a compressed object, a *symbol.*

.bmp file
A bitmap file under Windows and OS/2.

BNC
An industry-standard term and acronym for a type of connector for coaxial cable that is frequently used for a variety of applications in PROVOX® systems.

bode diagram
A plot of log-gain and phase angle values on a log-frequency base used for an element, loop, or output transfer function. This diagram also comprises similar functional plots of the complex variable.

Boolean
1. Algebraic rules for manipulating logic equations.

2. A quantity expressed as the result of logical operations such as AND,OR, NOR, or NOT.

boot or boot up
1. To start the operating-system software of a computer, so that the computer is ready for application software.

2. The process of initializing software to hardware to bring the software to a state where it accepts a configuration from a PROFLEX® device, ENVOX® workstation, or a large database console (LCON) or accepts a self-download.

bootstrap
To bring oneself into a desired state by means of one's own action. A machine routine whose first few instructions are sufficient to bring the rest of itself from an input device into a computer has bootstrapped itself.

bps
Acronym: bits per second.

breakpoint
A trace utility mode, in which accumulator values appear on the VDU as the trace point FST steps execute. In breakpoint mode, FST execution stops at each trace point.

BREG
Acronym: Boolean Register.

bridge
1. A highway communications device used to configure a network of devices by linking together highways that require extensive intercommunications.

2. A device used to interconnect local PROVOX® Highway IIs and to separate the traffic on them from the traffic on the network PROVOX Highway II.

Bridge Highway II
A highway that is used to interconnect bridges where there is a high volume of intercommunication.

British Standards Institute (BSI)
An independent organization that defines industrial and technical standards, used in the United Kingdom and elsewhere.

BSI
Acronym: British Standards Institute

buffer
1. A storage device that compensates for different rates of data flow, or time occurrences of events, when sending data from one device to another.

2. An isolating circuit that prevents a driven circuit from influencing the driving circuit.

bug
Slang term for an error, malfunction, or other defect, especially in software.

bus
A general term for a group of signal lines to be considered together, as in a data bus or address bus. The data highway of a PROVOX® system is such a bus.

button
A button on a mouse or trackball — shown as one of the following figures:

 primary (usually left) button

 middle button

 secondary (usually right) button

byte
A sequence of binary digits (bits) treated as an entity. Usually a byte consists of eight bits since it is a poser of two, and is large enough to represent an alphabetic, numeric, or special character code.

C
A computer language often used for writing operating systems and compilers. C also is a general-purpose language for engineering and other technical programming. ANSI standard X3.159 defines the language.

cable tap
A device for connecting the highway device to the highway cable. (Commonly referred to as a *tap*.)

CAD
Acronym: Computer Aided Design

calibration
1. A test of a transducer in which known measurand values are applied and corresponding output readings recorded under specific conditions.

2. The capability, or procedure used, to adjust an instrument for proper response (for example, *zero level*, *span*, *alarm*, and *range*.)

calibration block
Part of the Smart Device Input Card configuration. ENVOX forms allow the user to define whether each channel will handle direct or indirect measurement data. If indirect, the user configures a calibration block, which defines the relationship between transmitter engineering units (TEU) and process engineering units (PEU). The calibration block consists of four floating-point values (TEU High, TEU Low, PEU High and PEU Low), and a Boolean value if a square root calculation is to be performed.

See *TEU* and *PEU*.

Canadian Standards Association (CSA)
A Canadian organization that develops safety standards for industrial equipment and certifies products that meet those standards.

cancel wait enable (CWEN)
An operand specified in a function sequence table (FST) instruction that enables the operator to issue a cancel wait command during that step of a unit operation.

CAP
Abbreviation: Capacitor

capacitor (CAP)
An electronic component that stores electrical energy, blocks the flow of direct current, and permits the flow of alternating current.

carrier band
A type of base-band network used in a process control environment.

CASC
Abbreviation: Cascade Control

cascade control
A control technique that uses the output of one control loop (in AUTO or MAN mode) as the setpoint for another control loop (in RSP mode).

cascade menu
Also known as a pull-right menu. A submenu providing selections that expand the parent selection on a pull-down or pop-up menu.

CCITT
Acronym: Comite Consultatif International pour Telephonie et Telegraphie, or International Consultative Committee for Telephony and Telegraphy.

See *International Consultative Committee for Telephony and Telegraphy*.

CCOMP
Acronym: Custom Computer

CCON
Acronym: Custom Console

CDV
Acronym: Comma Delimited Values

CDVACAD
In the Graphics Toolkit software, a DOS batch file or WIndows interface button that automates the conversion of displays from CDV files to AutoCAD DWG files. The conversion creates DXF and PDF files as well.

.cdv file
A specially formatted ASCII file delimited by commas that contains ENVOX® data. The Intelligent Sensor Toolkit does not use .cdv files for function sequence tables (FSTs), but rather its own ASCII format. .cdv files are not related to the comma delimited file format of EXCEL.

CDVTOPDF
The Graphics Toolkit utility that converts ENVOX® CDV files to PDF files.

cell
The point where a row and a column intersect.

centered sigmoid function
A transfer function for hidden neurons that has an output approaching -1 for an input of minus infinity, an output approaching +1 for an input of plus infinity, and an output at 0 for an input at 0. The Intelligent Sensor Toolkit uses a centered sigmoid function. The particular function it uses is:

$$y=(1-e^{-x}) / (1+e^{-x})$$

center of gravity
Represents the mathematical center of geometric objects like volumes, areas, and curves. The center of gravity (COG), also known as the *centroid* or *center of mass*, is calculated during defuzzification to convert fuzzy values into absolute or numerical values.

Central Limit Theorem
A method of depicting frequency distributions through the use of histograms and bell curve charts. The Central Limit Theorem states that as the sample size increases, the sampling distribution of the mean becomes more like a normal distribution regardless of the nature of the underlying distribution.

central processing unit (CPU)
The portion of a computer that manipulates and modifies data, carrying out the instructions of the computer program.

CEU
Acronym: Continuing Education Unit

CFG
Abbreviation: Configuration

CFOC
Acronym: Custom Format Operator's Console

CHAN
Abbreviation: Channel

change in error
The difference between the value of current error and the error at last scan period. An input variable for a fuzzy logic controller noted by the symbol $\Delta \boldsymbol{e}$.

change in output
An output variable of a fuzzy logic control algorithm that determines the amount of change in control action. Noted by the symbol $\Delta \mathbf{u}$.

chaotic systems theory
A technology developed to facilitate modelling of seemingly unpredictable processes.

character
1. A term referring to an alphabetic, numeric, or other symbol that can be represented by a binary code, such as ASCII.

2. The transmitted sequence of bits that contain data, often including a start, parity, and stop bits surrounding the real data.

characteristic
A distinguishing feature of a process or its output on which variables or attributes data can be collected.

characteristic impedance
The ratio of voltage to current of signal on the cable.

chart window
A window within the Intelligent Sensor Toolkit application window. There can be more than one chart window open at a time.

checksum (CHK)
A byte or bytes added to the end of a data block containing the binary sum of all of the previous bytes in the block. Used in error-checking procedures.

HART protocol uses longitudinal parity checking, meaning the same check rule is applied in the same manner to each character.

See *Longitudinal Redundancy Check (LRC)*.

chemist
Plant employee responsible for creating batch recipes. Same as the recipe author.

CHIP
Acronym: Computer/Highway Interface Package

CHK
Abbreviation: Checksum

CIA
Acronym: Communications Interface Assembly

CIM
Acronym: Computer Integrated Manufacturing

CIM/21
Registered trademark of Industrial Systems, Inc. (ISI) for a supervisory process control system, data historian, and statistical quality control software. CIM/21 can link to C code to execute neural nets and other applications.

CIU
Acronym: Computer Interface Unit

CJC
Acronym: Cold Junction Compensator

class
A group of G2 objects that have the same attributes. For example, all sensors are of the class sensor. Classes are organized into a hierarchy in which each class inherits the attributes of its superior class, but may have additional attributes of its own.

See *Hierarchy of Classes* and *Superior Class*.

click
To press and release a mouse button (usually the primary mouse button) while the pointer is in a particular location.

client
An application program written for the X Window System.

client application
A program or tightly related programs which run on a client workstation.

client's company name
The client's company name is presented as the *client* within the database information portion of the Open Database dialog box in the Instrument Information System™ (IIS) Client software.

client/server
The relationship between the client and the server. Under the client/server relationship, some of the work in processing data is offloaded from the server to the client to implement the system resources.

closed loop control
Automatic feedback control in which the manipulated variable is adjusted in response to changes in controlled (and sometimes disturbance) variables based on a specific algorithm.

CMD
Abbreviation: Command

CMOS
Acronym: Complimentary Metal Oxide Semiconductor

CMPTR
Abbreviation: Computer Mode

CND-CC21 through CND-CC30
A group of FSTs in the ENSTRUCT structure that stores conditions and variables. These FSTs should be grouped by point type (DCD,DI, AI, and so on) and spread evenly among the 10 LCPs so that the load is distributed evenly among conditions that use variables and conditions which do not. Similar applications should be handled similarly for consistency.

CNSL
Abbreviation: Console

CO
Acronym: Current Output

COG
Abbreviation: Center Of Gravity

Cohen and Coon tuning
Refers to a closed loop tuning procedure.

cold junction compensator (CJC)
1. A transmitter variable (CJC Comp. Temperature) available from a Rosemount 3044C Temperature Transmitter.

2. A Rosemount 57-ohm resistance temperature device (RTD) that generates sensor cold junction compensation for a thermocouple.

COM
Abbreviation: Computer Mode

COMM
Abbreviation: Communications

comma delimited values (CDV)
An ASCII version of configuration data. The configuration data are in a specific order, separated by commas. CDV-format files result from both the ENVOX® export utility and the migrate utility.

See *.cdv file*.

command
An instruction, generally a word or string of alphanumeric characters, entered by the user at a keyboard or included in a command procedure. A command instructs the software to perform some pre-defined activity.

command area
The area below the drawing area on the AutoCAD screen. This area accepts typed commands.

comma separated value (CSV) file format
CSV file formats are structured as follows:

Each line begins a record. Each field in a record is separated with a comma. This separation implies that none of the fields within a record may contain commas within them.

commissioned tag
An existing, operational tag.

common cause
An inherent source of variation affecting the individual values of process output. Common cause appears as part of the random process variation during control chart analysis.

common-practice commands
HART protocol commands that provide functions implemented by most, but not necessarily all, smart field devices. These commands compose a library of functions commonly used by most smart field devices.

See *Device-Specific Commands.*

common tag information
Information associated with the device's tag number.

communications interface assembly (CIA)
A printed circuit card that links files of PROVOX® devices and the data highway. The CIA provides the timing and data conversion necessary for communications.

communicator
See *HART Communicator*.

company name
The IIS company name is presented as the *customer* within the database information portion of the Open Database dialog box in the IIS Client software.

complete installation
When a complete installation is selected, all of the software identified in *Section 5.5.1.1- Client Code Components* is installed. Select this installation type to copy the complete IIS code components.

complimentary metal oxide semiconductor (CMOS)
A family of digital integrated circuits that use transistors operating in a push-pull mode to carry out logic functions. A CMOS usually is capable of low-powered operation.

Computer/Highway Interface Package (CHIP)
A PROVOX® software product that allows user-written programs to interact with the PROVOX system. There are different CHIP versions, so that several types of computers can be the host computer.

computer integrated manufacturing (CIM)
A philosophy of industrial design and manufacture that uses computer-based systems to integrate and coordinate engineering functions, business functions, and factory operations.

computer interface unit (CIU)
A set of cards that acts as a protocol converter to the CCON, BCON, or CCOMP, to interface with the PROVOX® data highway.

computer mode (COM)
A point operating mode: the setpoint can be changed only by a unit operation, group point, CHIP program, or FST.

concurrent batch structure
Product flow between two units that are running at the same time.

concurrent task
The ENSTRUCT software function that can run as many as four tasks concurrently with a continuous unit such as a totalizer or jacket valve. The ENSTRUCT software includes standard subroutines for totalizers, differential gap, jacket valves, and flow check.

concurrent task active flag
The Boolean variable used by the ENSTRUCT software to confirm that the concurrent task FSTs are running (have not been turned off). This flag is referenced in the fail expression. The location of this variable is BV 3 of a batch unit.

condition
A TRUE/FALSE evaluation used by the ENSTRUCT software of a predetermined process state, such as *the valve is closed* or *the level is greater than 90%*. Conditions are defined in a condition table and accessed by their index number.

conditionals
PROVUE® console display elements that change color or present messages based on a change in a point attribute.

condition index number
In the ENSTRUCT software: a unique number assigned to each condition. This number contains the controller number, the LCP number, and the status bit number in the following format:

CCLLSS, where

- CC is the controller number
- LL is the LCP number (01 through 20)
- SS is the status bit number (01 through 16)

CONFIG
Abbreviation: Configuration

configuration (CONFIG)
1. Giving instructions and supplying reference information to the controllers and other devices that compose a process control instrumentation system.

2. For ESDS and G2, configuration consists of responding to prompts in a series of screen displays and manipulating icons on the G2 workspace.

3. For some PROVOX® systems, configuration consists of responding to prompts in a series of console screen displays. For other PROVOX systems, configuration consists of creating and manipulating special ASCII text files.

See *Workspace*.

configuration parameter
See *DH Configuration Parameter.*

configuration source file
A special ASCII text file that certain PROVOX® systems use for configuration. Such a source file contains instructions and reference information for the controllers and other devices of the system.

ConfiguWrite™ software
A Fisher-Rosemount Systems' line of advanced configuration products for RS3® systems.

conjugate gradient
A family of algorithms used for continuous optimization with characteristics intermediate between the quadratic Newton methods and steepest descent methods.

connection
A connection between neurons shows that the output of the predecessor neuron is sent to be one of the inputs to the successor neuron. Connections are only one way.

consecutive
Output units produced in succession; a basis for subgroup sample selection.

console
Generic term for the terminal or device an operator uses to monitor and control a process.

console bay
A portion of the PROVUE® console that contains the operator interface to the PROVOX® system. The operator interface consists of a video display unit (VDU) and a keyboard.

console computer
The hardware that runs the Operator Workplace Console Software.

console trend display (CTD)
A PROVOX® software product that continuously collects process operating data, then presents trend information at a console. CTD layers on CHIP software. CTD functionality is the same as that of the trend unit (which now is obsolete).

constraint
A limit imposed by the physics of a process or by control logic.

contiguous disk space
Free disk clusters that are adjacent to each other.

continuous distribution
A distribution for which the variable can take on all values. There are no gaps within the range of values it takes. This distribution is measured on a continuous scale.

continuous variable
A variable assuming a range of values.

control algorithm
A mathematical representation of a control action to be performed.

control (of process)/(statistical)
The process is in statistical control if it exhibits only random variations rather than systematic variations and/or variations with known causes.

ControlBlock
A computational block in an RS3 system that performs calculation, algorithms, and logic functions.

control chart
Graphic representation of a process showing plotted values in relation to, a central line, and one or more control limits.

A control chart is determined from small, periodically repeated samples. This chart is used to determine and maintain the statistical control of a process.

control code
An ASCII code reserved for hardware control purposes, such as advancing a page on the printer.

ControlFile
A device in an RS3 system that contains circuit cards that monitor plant process and control loops, and that provide data to other devices.

control horizon
The number of future control moves calculated by a model predictive controller.

control instructions
The actions applied to plant equipment of the control system. Control instructions contain one or more direct commands to final control elements.

control limit
A line or lines on a control chart used as a basis for judging the variation of subgroups. Variation beyond a control limit indicates special causes are influencing the process. Control limits are calculated using process data.

control loop
1. A signal path that includes a forward path, a feedback path, and a summing point, and that forms closed circuit control of a device.

2. An arrangement of mechanical and electronic components for process control. A product flows through one or more mechanical components of the loop. The electronic components of the loop continuously measure one or more aspects of the product flow, then alter those aspects as necessary to achieve a desired process condition. A simple control loop measures only one variable. More sophisticated control loops measure many variables and maintain specified relationships between those variables.

control menu
A menu containing commands used to manipulate the window. *Application windows*, *chart windows*, and some *dialog boxes* have *Control menu boxes* at the left of the title bar.

control menu box
An icon that opens the *Control menu* for a window or dialog box. The control menu box is always located at the left of the title bar.

control mode
Valid control modes for a control loop include manual (MAN), automatic (AUTO), remote setpoint (RSP). supervisory (SUP), direct digital control (DDC), and computer (COM).

control recipe
A recipe in the console memory with a specific batch ID, which through its execution, coordinates the production of a single batch of the specified product. This recipe may contain operator or system-generated information.

control room instrumentation (CRI)
Process control equipment designed for installation and operation in a control room environment.

control sequence
A type of primary control algorithm which provides basic functions such as alarming, data communication, tracking, and error signal calculation, but does not provide control action. This allows the user to create a customized control algorithm transfer function using FST instructions.

control steps
The lowest level of the batch process actions which perform the continuous control functions on plant equipment; these steps contain one or more direct commands to the final control elements.

controlled variable
A measured or calculated variable that is controlled to a reference value known as the setpoint. Multivariable controllers may have more than one controlled variable.

controller
1. A hardware or software device that operates automatically to regulate a controlled process variable.

2. A generic term for a PROVOX® Integrated Function Controller (IFC) or Unit Operations Controller (UOC) or multiplexer controller (MUX).

controller algorithm
A mathematical representation of a control action to be performed.

correlation coefficient (R)
A scale-independent measure of one actual output versus one predicted output. An R of 1.0 means that one variable is exactly proportional to another. An R of 0.0 means that a change in the value of a variable has no relation to another variable.

The equation for R is:

$$R = \frac{(\Sigma e_p)(\Sigma e_v) - (\Sigma e_p)(\Sigma e_v)/n}{([\Sigma e_p^2 - (\Sigma e_p)^2/n][\Sigma e_v^2 - (\Sigma e_v)^2/n])^{1/2}}$$

correspondence
In the context of the Intelligent Sensor Toolkit, correspondence means that the number of inputs, inputs plus time delays, outputs, or weights in two files match. Note that correspondence does not mean the variables have the same name, are the same, or that the time delays are the same.

CPI
Acronym: Characters Per Inch

CPU
Acronym: Central Processing Unit.

C_{px}
used in process capability studies, Cpx is a capability index defined by the formula. This index may range from a value of 0 to infinity with a larger value indicating increased process capability. A value near 1.33 is considered acceptable.

CRC
Acronym: Cyclic Redundancy Check

CRI
Acronym: Control Room Instrumentation

critical gain
The gain of a proportional controller required to produce oscillations of a constant amplitude in a process variable.

critical period
The period of oscillations produced in a process variable by a proportional controller having the critical gain.

CRT
Acronym: Cathode Ray Tube.

CSA
Acronym: Canadian Standards Association

CSV
Acronym: Comma Separated Value

CTD
Acronym: Console Trend Display

CU MPU
Acronym: Control Unit Microprocessor Unit

current to pneumatic transducer (I/P)
An electro-mechanical device that converts a DC signal (typically 4- to 20-milliamps) to a proportional pneumatic output signal.

current to pressure transducer (I/P)
An electric component or device that converts a milliamp DC signal to a proportional pneumatic pressure output signal.

cursor
A graphical component that indicates:

1. Where text will appear on the screen when keyboard keys are pressed.

2. The currently selected screen item.

custom computer (CCOMP)
A formerly-manufactured PROVOX® console that has a superset of the capabilities of the CCON, and enables user-written FORTRAN programs to interface with the console database.

custom console (CCON)
A formerly-manufactured PROVOX® console that allows as many as 1000 database points and 100 user-defined displays in its configuration. Additional CCON capabilities include discrete control device (DCD) points, user calculations, and extended functions (EDAS).

custom format operator's console (CFOC)
Early name for the CCON.

custom installation
When a custom installation is selected, the installer is prompted to identify the IIS client code components to be installed.

CWEN
Acronym: Cancel Wait Enable

cycle
A recurring pattern.

cyclic redundancy check (CRC)
1. A method of error detection in data transmission and data storage. The check evaluates both the number of ones and zeroes in a block (parity) and the position of the values in the block.

2. An error-checking technique in which a checking number is generated by a complex succession of bit shift and exclusive-OR operations on each character of a message. CRC-16 is one of several standard check algorithms.

See *Checksum* and *Longitudinal Redundancy Check (LRC*).

D
Abbreviation: Derivative Control Action (Rate)

D/A or DAC
Acronym: Digital to Analog, or Digital to Analog Converter

daemon
A UNIX system process that acts without a user requesting it. The console software uses the *rshd daemon* to communicate with remote applications on UNIX hosts.

DAI
Acronym: Derived Analog Input

damping
Reducing or suppressing oscillation of an output value after a change in the measured signal. When the response to an output change is as fast as possible without overshoot, the response is critically damped. If the response is slower than critical it is overdamped, and if an overshoot occurs the response is underdamped.

data
A general term that denotes information a microprocessor can process.

database
A collection of data stored in a systematic way so that searches and sorts are rapid and so that retrieval of items is simple.

database index (DBI)
A sequential integer by which a computer or other electronic device finds or keeps track of storage locations in a database.

database management system (DBMS)
The actual software which controls the database. The DBMS does the filing, retrieval, indexing, allocation of disk space for data, and so on, needed to handle data being stored, modified, or retrieved.

data concentrator
A highway device that collects and consolidates information for configurable, computing, and interactive controllers, interfacing the controllers to the data highway; also known as data concentrator unit (DCU).

data concentrator unit (DCU)
See *Data Concentrator.*

data frame
A group of contiguous bits whose structure is defined by a protocol.

data group
The name for data structures used by certain PROVOX® software products. Data groups resemble arrays, but their element values may be of different types. Data group definitions are included in a special configuration source file.

data highway
A data communications network for a limited area that functions as a logical highway token bus. In a PROVOX® Highway II communications system, there are three types of highways: Network Highway II, Bridge Highway II, and Local Highway II.

Data Historian (DH)
A PROVOX® software product that collects and manipulates large amounts of process operating data. DH produces graphic trend plots and performs statistical quality-control functions for realtime and archived data. DH layers on CHIP software.

data link
A unique building block within the Documentation Toolkit software that sets up database fields within an AutoCAD drawing.

data link layer
A layer of the HART protocol that specifies the message frame format (Layer 2 of the Open Systems Interconnection [OSI] model).

data processing (DP) printing style
Printer fonts containing fewer dots than letter-quality fonts, to be printed quickly by the print head as it moves bidirectionally.

data record analog output (REC AO)
A multiplexer point type that copies a value from an analog input point in the multiplexer, then outputs the value to a field device. A common use for the REC AO point type is for strip-chart recording.

data seek
An event in a G2 system where a rule, procedure, table, or some other facility requires a value of a variable whose validity interval has expired. G2 will attempt to revalidate the sensor by retrieving a current value.

datasheet
A paper form which records all of the pertinent information about a device. This sheet may consist of one or more pages. The sheet can be site-specific or standardized. A standardized set of data sheets are the ISA Forms.

data type
Determines the rules that entries for specific columns must follow.

data update rate
Digital communications on the HART link occurs at 1200 baud, which means the digitally communicated variables are updated from twice a second to once every four seconds, depending upon the number of channels and variables configured.

DAT files
In the Graphics Toolkit software, definition files that several of the utilities use. Definition files (also known as DAT files since the file extension is DAT) consist of a list of file names separated by display names.

dB
Acronym: Decibel

DBI
Acronym: Database Index

DBMS
Acronym: database management system

dBmV
Acronym: Decibel millivolt

DBND
Abbreviation: Deadband

dc
Acronym: direct current

DC
1. Acronym: Data Concentrator
2. Acronym: Direct Current

DCD
Acronym: Discrete Control Device

DCD template
A collection of as many as 16 setpoints defined for a DCD point during configuration. Each setpoint consists of an input bit pattern and an output bit pattern for the DCD's discrete I/O channels. A DCD template makes it possible for the same DCD point to use different combinations of channels at different times, and also allows multiple DCD points to use the same setpoints by referencing a common DCD template.

DCE
Acronym: Data Communications Equipment

See *RS-232-C*.

DCL
Acronym: Digital Command Language

DCP
Acronym: Direct Control Point

DCPC
Acronym: Dual Channel Port Controller

DCS
Acronym: Distributed Control System

DCU
Acronym: Data Concentrator Unit (same as data concentrator)

DDC
Acronym: Direct Digital Control

DDP
Acronym: Detail Display Parameter

DDPRD
Acronym: DDP Read

1. The DDPRD instruction in a function sequence table (FST) step that allows the detail display parameter (DDP) of a point to be read directly into the specified signal value of the logic control point (LCP).

2. A PROVUE® and Operator Workplace software display attribute that allows a DDP description to be shown by specifying its DDP number (mnemonic) and DDP occurrence number.

DDPWT
Acronym: DDP Write

The DDPWT instruction in a function sequence table (FST) step enables the user to write values stored in the signal value registers to a point's detail display parameters (DDP's). The DDP must be writable and the function associated with the DDP must be enabled.

deadband
The area around a limit where outputs are held or changes are suppressed. This suppression avoids *chattering* due to discontinuities or noise when the process is operating around a limit.

See also *Alarm Deadband*.

dead-time
The time interval in which no process change occurs following a change in a manipulated or disturbance variable for a process. Dead-time is one of the most difficult dynamic characteristics for a feedback controller to handle. Feed-forward control or model-based compensators are often required to adequately control dead-time dominant processes.

deadzone
The configurable amount by which a variable must change since it was last reported by exception data reporting to the I/O driver.

dearchiving
Restoring historical information pertaining to a tag number.

DEC
Acronym and mark: Digital Equipment Corporation

decibel
The relative difference between two signal levels expressed logarithmically.

decibel millivolt
A measure of signal strength that is calculated by using the following formula:

dBmV = 20 log (signal voltage ÷ 1 millivolt)

DECnet
DEC's network and communications software based on the DIGITAL Network Architecture (DNA).

See *TCP/IP*.

decommission
A tag number that is out of service.

decoupling
The technique of minimizing or eliminating the effects of interaction between multiple manipulated and disturbance variables.

default units
Units of measurement used to store numeric information into the database.

default update interval
A G2 attribute of a GSI sensor. The value of this attribute determines how ESDS will report data to G2.

See *Attribute* and *Sensor*.

definition file
See *DAT files.*

defuzzification
The process of converting *fuzzy* variables like warm and cool into an absolute variable like 78-degrees F. This conversion is the final step in a fuzzy logic controller. This conversion process is accomplished using Membership functions.

demo version
The demonstration version of the Intelligent Sensor Toolkit program. The demo version does not create model files or perform the *Export* or *Verify* operations. It still permits *File, Preprocess, Design,* and *Train* operations, and the display of various charts.

After purchasing the toolkit, the demonstration version can be turned into a full version by contacting a Fisher-Rosemount Systems' representative or sales office and obtaining a license authorization code.

demodulation
In the HART protocol, the process of recovering the original information at the receiver.

See *Modulation*.

derivative action
Another name for derivative control action.

derivative (rate) control action (D)
Control action in which the change in the output signal is proportional to the first time derivative (rate of change) of the input signal. Rate action is another name for derivative control action. A common use for derivative control action is to smooth changes in output values that correspond to rapidly fluctuating input values.

derived analog input (DAI)
An Industrial Systems, Inc. CIM/21 point type. This input functions like an analog input, except that its source can be an equation or the output of a program.

DESCR
Abbreviation: Descriptor

descriptor
A short user-defined character string that indentifies a specific configuration element. Examples: HIGHALM for an alarm and GAL/HR for engineering units.

design
The operation in the Intelligent Sensor Toolkit where the inputs and hidden neurons are determined. Choosing the *Design -> Inputs and Delays* menu command determines the proper input variables and time delays to use. Choosing the *Design -> Number of Hidden Neurons* menu command determines the optimum number of hidden neurons to use.

desktop operator interface unit
An optional operator interface to the PROVOX® system through the PROVUE® console. This operator interface is a stand-alone video display unit (VDU) and keyboard set used in place of one or more PROVUE console bays. The desktop operator interface unit can be remotely located as much as 150 feet from the PROVUE console.

detail display
1. A type of pre-formatted console display that shows the values of operating parameters and certain other parameters of a specified point.

2. A user-defined display identified in the PROVUE Device form; contains a detail display parameter (DDP) window with two or more DDPs in it.

detail display parameter (DDP)
An item of information usually considered changeable or tunable for a control loop or point. Common examples are gain, rate, reset, and alarm trip points.

detection
A method of identifying unacceptable output after it has been produced and separated from acceptable output.

DEV
Abbreviation: Device

deviation
Usually, the difference between setpoint and process variable. More generally, a departure from a desired or expected value or pattern.

deviation alarm
An alarm that signals a specified amount of difference exists between two monitored values; usually the process variable and the setpoint. In PROVOX® systems, the A alarm is the deviation alarm.

device
A piece of electronic hardware that performs one or more prescribed functions.

device information
Information specific to a device, which is then specific to a tag number (once a tag number is assigned to the device). Device information is usually composed of the information found on a standard data sheet. Device information is also referred to as device specific information.

device-specific commands
HART protocol commands that provide functions that are unique to a particular smart field device. These commands access information required for setup and calibration, and information about the construction of the device.

See *Common-Practice Commands*.

device specific information
Information associated with the specific instrument (e.g., manufacturer, model number, and so on).

device status byte
The HART protocol specifies that each smart field device will provide an 8-bit byte indicating integrity of the smart field device when it is requested by a host device. The device status byte is returned with every response message.

DEVSTAT
Acronym: Device Status

1. This remote detail display parameter (DDP) attribute, 235:DEVSTAT, allows the device status byte to be displayed as a bit pattern.

2. The DEVSTAT instruction in a function sequence table (FST) step enables the user to access the device status byte and the alerts byte.

See *Device Status Byte*.

DH
Acronym: Data Historian

DH configuration parameter
Attributes of SDFs and HDFs, for example, OLD RCRD, NEW RDRD and OCC.

DI
Acronym: Discrete Input

diagnostics
One or more programs in a computer or microprocessor that can detect and pinpoint a configuration error or a hardware fault. Also, the utility or functionality such programs add to a product.

DIAGS
Abbreviation: Diagnostics

dialog box
A window containing information or a prompt for input. A Dialog Box may provide an indication of the current state of work in progress, ask a question, issue a warning, or draw attention to an error.

DIGCOMM
Abbreviation: Digital Communication

This remote detail display parameter (DDP) attribute, 236:DIGCOMM, allows the user who has configured the Loss Of Digital Communications smart error state as WARNING to see the condition of the digital communication when a point indicates that a warning has occurred.

See *Smart Error State (SES)*.

digital
A term applied to a signal or device that uses binary digits to represent continuous values or discrete states.

digital command language (DCL)
DCL provides over 200 commands and functions to use in communicating with the VMS operating system.

Digital Equipment Corporation (DEC)
A manufacturer of general purpose minicomputers. DEC builds VAX and AXP series computers, which are used in or can be interfaced with PROVOX® systems by way of CHIP software. PROVOX software products usually are compatible with at least one DEC computer model.

digital input (DI)
A number value input.

digital output (DO)
Transducer output in the form of a series of discrete quantities coded in a system of notation.

digital signal processing
The arithmetic processing (such as filtering or amplification) of real-time signals which are sampled at regular intervals and digitized.

digital to analog converter (DAC or D/A)
An electronic circuit (usually an IC) that converts a digital signal (digital data) into an analog signal of corresponding value.

digital transducer
A transducer incorporating HART compatible signals used for additional control and operator display capabilities.

digital valve controller
A valve controller incorporating HART compatible signals used for additional control and operator display capabilities.

digital volt meter (DVM)
A test instrument that measures voltage, current, or resistance, and gives numerical readings.

DIO
Acronym: Discrete Input/Output

DIP
Acronym: Dual In-line Package

DIP switch
A dual in-line package (DIP), a common type of housing for integrated circuits (in this case, a switch), which is easily dip-soldered into printed circuit boards.

direct acting
Control action in which the absolute value of the output signal increases as the absolute value of the input signal (process variable) increases.

direct control point (DCP)
A regulatory controller point type which provides control for continuous processes. A DCP is a collection of setpoint, process variable, and valve position values along with tuning parameters for a control loop.

direct current (DC or dc)
A flow of current in only one direction (as opposed to alternating current) in an electric circuit.

direct digital control (DDC)
A loop control mode: a process-control computer or a computer program, a unit point, or a logic control point directly sets the output of a control loop.

direct memory access (DMA)
A method of directly transferring data in and out of memory. DMA is used when a device can transmit data faster than a CPU can input the data and store it in memory. A DMA controller is used to control the storage of data into memory instead of the CPU. This action permits a very fast data transfer rate.

direct screen reference (DSR)
A one- or two-digit number for a database point currently displayed at a console. To access or change data for the point, an operator need only enter the DSR.

direct screen reference indication
A graphic technique indicating, by an outline, that an item is selectable. Once selected, the item is outlined by a highlighted box.

discrete
Having either of two states, for example, on or off, or 1 or 0.

discrete control device (DCD)
A PROVOX® point type. A DCD point combines as many as 8 discrete output and 16 discrete input channels into a single point. A DCD point uses a DCD template which contains as many as 16 setpoints for driving outputs and matching input/output states.

A common use for a DCD point is to control a discrete device that provides feedback about its status, such as a solenoid valve with limit switches. If the point works with a DCD template, it can use different combinations of channels at different times during the execution of a process-control algorithm.

discrete input (DI)
A PROVOX® point type. A DI point monitors a single discrete value of the process variable. That is, a DI point reads discrete data from a sensor or other system device.

discrete input/output (DIO)
The reception and transmission of discrete signals. In PROVOX® systems, DIO usually refers to a discrete input/output card in a controller.

discrete monitor (DM)
A PROVOX® point type. A DM point reads 16 discrete input values (process variables), then consolidates these values into one representation: either a 16-bit binary value (0—65535) or a 4-bit binary-coded decimal value (0—9999).

A common use for a DM point is to read data from a sensor or other device that transmits information in multiple discrete signals.

discrete output (DO)
A PROVOX® point type. A DO point generates a single discrete value referenced by the setpoint.

diskette
A magnetic storage medium with 1.4 megabytes (or 740 kilobytes) of data capacity contained on a platter in a thin, 3.5-inch or 5.25-inch square plastic case. Also called a *floppy disk*.

DISPEDIT
The Graphics Toolkit display editor menu within AutoCAD software. This menu accesses the pull down menus required to build displays.

dispersion
Variation in products sampled at different times, locations, and so forth, in a process.

display
A visual presentation of data, which in PROVOX® systems, usually is on a PROVUE® or Operator Workplace console screen.

The ENVOX diagnostics utility provides displays showing the integrity of PROVOX system highways and highway devices. Diagnostics displays offer several utility operation options implemented by using pull-down menus and by pressing dedicated keys.

See *Detail Display*, *Detail Display Parameter (DDP)*, *Display Attribute*, *Faceplate*, and *Group Display*.

display attribute
1. Attributes of points (SP, PV, and so on) that can be displayed in custom graphics displays.

2. A parameter of a process control point (setpoint, for example) that can be displayed in custom graphics displays.

See *Attribute (ATTR)* and *Detail Display Parameter (DDP)*.

DISPTEXT
The default text style of the Graphics Toolkit software AutoCAD utilities. This text style simulates as closely as possible the text on the PROVUE® console.

Distributed Control System (DCS)
Fisher-Rosemount System's PROVOX® product line is an example of a DCS.

Distributed Systems Products (DSP)
An early name for the PROVOX® product line.

distribution
A means of describing the output of a common cause system of variation in which individual values are not predictable but in which outcomes as a group form a pattern that can be described in terms of its location, spread, and shape.

Location is commonly expressed by the mean or average, or the median. Spread is expressed in terms of the standard deviation or the range of a sample. The distribution's shape incorporates such characteristics as symmetry and peakedness.

disturbance variable
A variable, either measured or unmeasured, that cannot be manipulated or controlled. A disturbance variable is sometimes referred to as a *wild variable*. Disturbance variables act as an external load on a feedback controller. Their effects can sometimes be reduced by measurements using feed forward or model-based controllers.

.di$_{[x]}$ file
Temporary file to store a copy of the .net file for the *Design Inputs and Delays* operation.

DLL
Acronym: Dynamic Link Library

DM
Acronym: Discrete Monitor

DMA
Acronym: Direct Memory Access

DMC
Acronym: Dynamic Matrix Control

DO
Acronym: Discrete Output

DOCVUE™ Electronic Documentation
A mark of Fisher-Rosemount Systems for the electronic documentation library.

DOS window
A window that opens to allow the user to easily execute most simple DOS commands.

dot pattern set
A fixed set of codes stored in an impact printer's memory to form characters in different typefonts and styles.

double click
To rapidly press and release a button on a mouse or trackball twice without moving the pointing device. Double-clicking carries out an action, such as starting the Intelligent Sensor Toolkit application.

download
1. To transfer configuration instructions and reference information from a configuration device to other devices of a process control system.

2. For ENVOX® software: moving configuration instructions and reference information from the configuration database to other devices in the control system.

3. For Recipe Manager software: converting the recipes into procedures and moving them into the ENVOX database.

DP
Acronym: Data Processing Printing Style

DPS
Acronym: Dot Pattern Set

DR
Acronym: Display Read-ROM (for PCON)

drag
Pressing and holding down a mouse button while moving the mouse.

drawing exchange format (DXF)
An ASCII format for Drawing Interchange files. Drawing exchange format was originated by Autodesk as a way to move drawings across hardware platforms. This format has been adopted as an exchange format by many CAD vendors.

drawing stack
A feature of the Documentation Toolkit software that allows the user to move bidirectionally between as many as 16 AutoCAD drawings within a single drawing session.

drive
The electromechanical device that moves a diskette or hard disk so the computer can read or write data to it.

drop cable
The cable that connects a highway device and the cable tap.

drop-down list
Appears in dialog boxes initially as a rectangular box with the current selection shown and an arrow in a square box to its right. When the arrow is selected, a list of available choices appears. A choice or type can be selected.

DRVR
Abbreviation/acronym: I/O Driver

DSE
ENVOX® threaded binary file.

DSETOFL
The graphics Toolkit utility that converts ENVOX® DSE files to PDF files.

DSETOPDF
The Graphics Toolkit utility that converts ENVOX® DSE files to PDF files.

DSP
1. Abbreviation: Display

2. Acronym: Distributed Systems Products

3. Acronym: Digital Signal Processing

DSR
Acronym: Direct Screen Reference

DSR indication
A graphic technique indicating, by an outline, that an item is selectable. Once selected, the item is outlined by a highlighted box.

DT
Acronym: Digital Transducer

DT/DVC
Acronym: Digital Transducer/Digital Valve Controller

DTE
Acronym: Digital Terminal Equipment

See *RS-232-C*.

dual channel port controller (DCPC)
A device that controls direct memory access within the Hewlett Packard computer family.

dual in-line package (DIP)
An integrated circuit packaging method that allows for two rows of conductors spaced at least 0.3 inch (7.6 mm) apart with each conductor in the row spaced on 0.1-inch (*2.*5 mm) centers.

dump device
A tape device or a disk to which a database and its associated transaction log can be backed up for easy retrieval.

dump files
Contain only the information of all of the databases, as opposed to unused space.

duplex
See *Full Duplex Communication* and *Half Duplex*.

DVC
Acronym: Digital Valve Controller

DVM
Acronym: Digital Volt Meter

DW
Acronym: Display Write-RAM (for PCON)

DXF
Acronym: Drawing eXchange Format

DXFIN
The AutoCAD command that imports a DXF file into AutoCAD.

DXFOUT
The AutoCAD command that exports an AutoCAD drawing to a DXF file.

DXFTOPDF
This Graphics Toolkit utility that converts DXF format file.

DXFTOUDF
The Graphics Toolkit utility that converts DXF files to UDF files.

dynamic link library (DLL)
A piece of executable code that acts as a run-time function library for programs.

dynamic matrix control
The name used for Model Predictive Control by the Dynamic Matrix Control Corporation. The name reflects the use of a matrix to control a process by relating manipulated and disturbance variables to controlled variables and constraints.

dynamic variables
One of two types of HART-defined variables that smart field devices provide for host devices to access by HART commands. The dynamic variables are:

- *primary variable (PV)*
- *secondary variable (SV)*
- *tertiary variable (TV)*
- *fourth variable (FV)*

See *Non-Primary Variables (NPV)*.

EAROM
Acronym: Electrically Alterable Read-Only Memory

ECF
Acronym: Element Control FST

ECF-CC01 through ECF-CC20
This group of FSTs in the ENSTRUCT structure is where the element control logic is configured. The element control logic is distributed evenly among the LCPs to minimize loading.

ED
Acronym: Emergency Download

EDAS
Acronym: Extended Data Acquisition System

EEPROM
Acronym: Electronic Erasable Programmable Read-Only Memory

EIA
Acronym: Electronic Industries Association

electrically alterable read-only memory (EAROM)
A type of semiconductor memory device, electrically erasable and reprogrammable, that is used primarily for read-only information.

electromagnetic interference (EMI)
The general category of electrical noise induced by radio frequency and magnetic, electrostatic, or capacitive coupling.

electronic erasable programmable read-only memory (EEPROM)
A semiconductor memory device that is programmable electrically, but erasable only by exposure to high-intensity ultraviolet light.

Electronic Industries Association (EIA)
A group of electronic manufacturers that creates industry standards for communication between electronic devices. Among these standards are RS-232 and RS-449.

electrostatic damage (ESD)
Deterioration of integrated circuits due to high levels of static electricity. Symptoms of ESD include degradation of performance, device malfunction, and complete failure.

element control FST (ECF)
Int the ENSTRUCT software: one of the 14 FSTs in the [.UTILITIES.COMMON] directory. These subroutine FSTs provide control for motors and valves.

emergency download
A download from a special download file while the SYBASE server is not available or if the ENVOX® database is suspect.

EMI
Acronym: Electromagnetic Interference

EMX
Acronym: Expanded MUX Controller

ENB or ENBL
Abbreviation: Enable

end delimiter
An octet that defines the end of a frame.

end time
The time represented by the right vertical axis of the plot area.

The *End Time is* can be aligned with a sample in the historical data file permitting multiple traces with different sample times or rates to be aligned for comparison. End Times may be entered when adding a trace or by the Data Historian's Change Time function. End Times are increased or decreased using the Forward or Backward function, respectively.

engineering unit (EU)
The range of measurement for an analog process variable. The low (0 percent) and high (100 percent) engineering unit limits define the anticipated range of the variable. For example, low and high engineering-unit values of 50 and 1550 might define a range for degrees Fahrenheit. In this example, the EU span would be 1500 degrees; each percent of the EU span would equal 15 degrees.

engineering units descriptor
The name of the units an engineering units value represents. For example, *MTRS* for *meters*, *LB/SQIN* for *pounds per square inch*, and *DEGSC* for *degrees celsius*.

engineering units high value (EUHV)
1. A floating-point number that represents the upper limit of the input range of an analog input value.

2. Former name for High Engineering Units Scale Factor (HIEC).

engineering units low value (EULV)
1. A floating-point number that represents the upper limit of the input range of an analog input value.

2. Former name for Low Engineering Units Scale Factor (LOEC).

enhanced pulse count input (EPCI)
A PROVOX® point type. An EPCI point reads a series of electronic pulses or switch closures as an unsigned, 16-bit integer value, then calculates accumulation and rate values.

ENVOX® software
A Fisher-Rosemount Systems' line of configuration products for PROVOX systems. The use of a third-party relational database is the principle distinguishing feature of configuration with ENVOX software.

ENVOXDB database
The default user database which stores all configuration data and is created by ENVOX® software upon ENVOX installation.

ENVOX diagnostics program
The ENVOX diagnostics program provides displays that show the integrity of PROVOX® system highways and highway devices.

Using the ENVOX diagnostics program, specific device errors can be identified and the source of intermittent faults traced. Diagnostic displays provide extensive coverage of system conditions.

envox_read
An ENVOX® system database containing reference data which is used by all of the ENVOX user databases in the system. The database is created by ENVOX software upon ENVOX installation.

ENVPDF
The Graphics Toolkit VAX COM file that automates the conversion of displays from the ENVOX® database to PDF files.

ENVTODSE
The VAX-based Graphics Toolkit utility that converts displays in the ENVOX® database to DSE files.

ENVTODSP
The VAX-based Graphics Toolkit utility that converts displays in the ENVOX® database to DSP files.

EOT
Acronym: End of Transmission

EPCI
Acronym: Extended Pulse Count Input

epoch
One complete pass through the training and tests of sets of observations.

EPROM
Acronym: Erasable Programmable Read-Only Memory

equipment class
A characteristic of equipment that a recipe author can specify. For example, *50,000 lb* and *Stainless Steel* can be equipment classes.

equipment requirements
Identifies the characteristics of the equipment necessary to run the batch process. These requirements can vary over a broad range of detail depending on whether they involve a general recipe or a control recipe.

equipment train
The interconnected units and process equipment that can be used to produce a batch product.

erasable programmable read-only memory (EPROM)
A semiconductor memory device that is programmable electrically, but erasable only by exposure to high-intensity ultraviolet light.

ERR
Abbreviation: Error

error
The value of PV – SP, or the difference between the setpoint and the process variable. An input variable for a fuzzy logic controller noted by the symbol ***e.***

error signal
In a closed loop, the difference between the actual value of a particular signal and its desired value (usually PV and SP).

error-squared PI_PID
A type of primary control algorithm which is similar to a normal PI_PID algorithm, but acts on the square of the error signal (where the sign of the error signal is retained) instead of the normal error signal value.

ESD
Acronym: Electrostatic Damage

ESDS
Acronym: Expert System Data Server

Ethernet
A Xerox mark for a local area network communication protocol using coaxial cable. The protocol permits multiple access with collision detection, and arbitrates the use of a 10 Megabit-per-second baseband. Ethernet conforms to IEEE standard 802.3.

EU
Acronym: Engineering Units

EU 0%
Acronym: Engineering Units 0% Value

This remote detail display parameter (DDP) attribute, 1:EU 0%, allows FIELDVUE variable 198, EU 0% value, to be displayed or changed on a PROVUE® or Operator Workplace console. This single-occurrence DDP allows the operator to change the low-scale value, which can be a floating-point number: however, it may not be the same as the high-scale value.

EU 100%
Acronym: Engineering Units 100% Value

This remote detail display parameter (DDP) attribute, 2:EU 100%, allows FIELDVUE variable 197, EU 100% value, to be displayed or changed on a PROVUE® or Operator Workplace console. This single-occurrence DDP allows the operator to change the high-scale value, which can be a floating-point number: however, this number may not be the same as the low-scale value.

EUHV
Obsolete acronym: Engineering Units High Value (replaced by HIEC: High Engineering Units Scale Factor)

EULV
Obsolete acronym: Engineering Units Low Value (replaced by LOEC: Low Engineering Units Scale Factor)

event
In an RS3 system, the occurrence of some action that is configured to make an entry in an event list.

event lists
In an RS3 system, a set of 10 lists that contain messages that are generated by events.

EWMA
Acronym: Exponentially Weighted Moving Average

exception
A type of unsolicited reporting: the reporting device sends a value only if the sample period has expired and the value has changed significantly since the last transmission.

exclusive OR (XOR)
A logical combination function of two values such that if one or the other, but not both, of the values is true (0 and 1), then the result is true (1). If both are true (1 and 1) or both are false (0 and 0), however, the result is false (o).

This idea is extended to bytes in a data block by taking the corresponding bits of each byte, XORing them, and putting the result in the corresponding position in a result byte.

HART protocol uses a checksum for a message that XORs each byte into the previous result.

See *Checksum* and *Longitudinal Redundancy Check* (LRC).

exit key
Pressing the EXIT key terminates user interaction with the system and re-displays the previously displayed screen. The EXIT function implies that no further data will be entered and the information that has been previously entered is considered complete.

The *F10* key is substituted for the **EXIT** key on the DEC VT220 and VT3xx keyboards. The *DIALOG* key is substituted for the *EXIT* key on Tektronix 4207 keyboards. A *PROVUE®* *multi-function* key is assigned the *EXIT* function when Application Window is selected. Also, simultaneously pressing the *CTRL* and *Z* keys is interpreted as *EXIT* from most display terminals.

EXP
Abbreviation: Expected

expanded multiplexer (EMX)
A PROVOX® controller that is mainly used as a multiplexer/data acquisition device to communicate and exchange data with programmable logic controllers (PLCs) and for discrete device control.

Expert System Data Server (ESDS)
Fisher-Rosemount System's software package that provides two-way communications between the G2 expert system and CHIP.

exponentially weighted moving average (EWMA)
A control chart in which the stability of the process is evaluated using an exponentially smoothed moving average. Individual observation or subgroup averages taken at earlier times are given progressively smaller weights.

exponential smoothing
A method of forecasting based on forming a new, smooth series by giving weights to the original series.

export
The extraction of ENVOX® configuration data and placing it in CDV files.

export set
CDV files prepared for import to an ENVOX® database.

expression
A mathematical phrase which is used in a unit operation. An expression always follows the sequence of *operand-operator-operand*. In ASCII configuration source files, the sequence *operand-passive symbol-operand*.

EXT
Abbreviation: Extended or External In a PROVOX® device, EXT usually refers to an External Interface card.

extended ac^2
A multiplexer point type that monitors signals associated with Fisher-Rosemount Systems' ac^2 100 instrumentation, and also allows an operator of a console or other PROVOX® highway device to adjust the ac^2 instrument setpoint value.

See *ac2*.

extended analog input
A multiplexer point type that accepts an analog signal from a field device, and can apply a first-order filter, square-root conversion, or thermocouple conversion before passing the value to the data highway.

extended analog output
A multiplexer point type that receives an analog value from the data-highway, then converts that value to an analog signal which is sent to a field device. If the expected value does not arrive over the highway, the algorithm sends a default signal to the field device.

extended data acquisition system (EDAS)
Additions to the basic console and unit controller functions that permit pressure/temperature compensation, alarm generation, accumulations, and rate-of-change calculations.

extended discrete output
A multiplexer point type that receives a discrete value from the data-highway, then converts that value to a discrete signal which is sent to a field device. If the expected value does not arrive over the highway, the algorithm sends a default signal to the field device.

extended functions
Optional capability that can be enabled for certain point types, increasing the number of functions the point can perform. Common extended functions are pressure/temperature compensation, signal characterization, and extended alarms.

extended pulse count input (EPCI)
A PROVOX® point type. An EPCI point reads a series of electronic pulses or switch closures as an unsigned, 16-bit integer value, then calculates accumulation and rate values.

faceplate
An established display figure that shows the most important information about a process control point. Faceplates are vertical rectangles, several of which fit on a console screen at once.

FAIL
The state to which an activity point running a procedure (recipe) may go when an error is encountered. The operator may correct the error condition and RETRY.

fail expression enable flag
In the ENSTRUCT software, a Boolean variable used as a switch in a fail expression to enable or disable the expression. This variable is stored in BV 1 of a batch unit.

fast access
See *Accelerator*.

F-C-C:A
Acronym: File-Card-Channel:Attribute

FCS
Acronym: Frame Check Sequence

FDFWD
Acronym: Feed-forward

feedback
Describes a process in which the effect of an output (or the output itself) is fed back to the process and used to improve the control of future outputs. A feedback controller is one in which the manipulated variable effects the controlled variable through output feedback. The controller manipulates an output to drive the PV towards setpoint.

Feedback can be positive or negative, however, positive feedback is inherently unstable. Negative feedback is ultimately used in feedback control and is characterized by an oscillating response. The composite dynamic loop gain determines the degree of oscillation (damping) and whether the loop is stable or not.

feed-forward (FF or FDFWD)
A type of control action in which an input is used to determine an output that has no effect on the input. Feed-forward controllers are considered to be open loop. These controllers are often used to improve the response of a control system to external disturbances.

FET
Acronym: Field Effect Transistor

FF
Acronym: Feed-forward

FIC
Acronym: Flow Indicating Controller

field
1. The area of a process plant outside the control room, where measurements are made, to and from which communication is provided.

2. Part of a message devoted to a particular function, such as an address field or command field. The size and rules for the interpretation of each field are part of the protocol specification.

3. On a software screen, a display location with a prompt indicating user access, a message, or other meaningful information.

field units
Default units of storage for a device.

FIELDVUE® instrumentation
A mark owned by Fisher Controls for a series of instruments, such as the *Type DT4000, DVC5000 Series, and DVC5000f Series.*

FIELDVUE shadow AO point
A PROVOX® point type. The FIELDVUE shadow AO point is an extension of the AO point, much like the virtual AO point. The FIELDVUE shadow AO point serves as a placeholder in the controller and ENVOX databases for the AO control function. The control function is performed in the FIELDVUE instrument. The FIELDVUE shadow AO point allows an operator to access and change the SP and MODE, and the following DDPs: RS (resource attribute value) and OFFSCAN (shadow point offscreen flag).

FIFO
Acronym: First In, First Out

FIL
Abbreviation: Filter

file
A collection of related computer information or data records identified for storage on a hard disk or diskette.

file-card-channel:attribute (F-C-C:A)
The syntax for the file, card, and channel address of a signal source or destination for PROVOX® points must be separated by a dash with no spaces between, followed by a colon and point attribute, if applicable.

file handle
A DOS and Windows term for a pointer to an open file. One way to change the maximum number of files in the system is with the FILES = statement in the config.sys file.

filter
1. A means of creating a tag list based on specified search terms.

2. A filter treats data values in a trend with a calculation the original data value plus previous or subsequent data values in the trend. Filters in the Intelligent Sensor Toolkit use a first order low pass filter. The equation is:

$F_t=(1-a) \bullet U_t+a \bullet F_{t-1}$

where *F* is the filtered value, *U* is the unfiltered value, a is the filter coefficient between 0 and 1, and *t* is the time of the data.

filter time constant (FTIM)
The length of time required for 63.21 percent of a step change at the input of a filter to appear at the output.

firmware
Computer or microprocessor programming stored in an integrated circuit, in such a way that users cannot change the programming.

first in, first out (FIFO)
An order for handling or processing items placed in a queue or buffer. The first item placed in the queue or buffer is the first item retrieved for use.

See *Last In, First Out (LIFO).*

first pass flag
1. In general, the first pass flag is a Boolean register or variable that is set to TRUE the first time the initialization code in an FST or operation runs following a download. On subsequent executions, the FST or operation branches around the initialization code after checking the first pass flag.

2. In ENSTRUCT software database shell CND FSTs and the continuous control shell FSTs the first pass flag is local FPreg 29.

3. In ENSTRUCT software operation code, the first pass flag is Boolean variable BV4.

first prefix
An optional general location identifier.

FISHERGT.COM
The Graphics Toolkit VAX COM file that contains logical definitions the software uses.

Fisher Universal Documentation Graphics Editor (FUDGE)
A collective name for AutoCAD-based graphics modules of Fisher-Rosemount Systems products.

fixed gain (K)
A multiplication factor for a process control value. System or device configuration establishes the amount of this factor. A user cannot change a fixed gain without reconfiguring.

fixed program memory
Memory that is occupied by programs scheduled to run at system startup and that remain resident within system memory after startup. Memory occupied by these programs is subtracted from the total system memory present when calculating memory requirements for application software programs, since it is always in use, and is therefore *fixed*.

FL
PROFLEX® display file format.

flex point
See *Multivariable Point*.

floating-point
1. Pertaining to decimal value presentation in which the position of the decimal point does not remain fixed with respect to one end of the digits.

2. An arithmetic notation in which a number is represented by a bounded number (mantissa) and a scale factor (exponent) consisting of a power of the number base.

floating point data
Non-integer numeric data.

floppy disk
See *Diskette*.

flow chart
A schematic representation of a sequence of process operations.

FLTODSP
The Graphics Toolkit utility that converts PROFLEX® FL files to DSP files.

focus
Indicating that a window, window component or menu selection may receive keyboard input.

font
Complete assortment of letters, punctuation marks, numbers, and special characters of a given typeface, weight, and size.

form
Within IIS, a form is a report. This report can consist of a data sheet or a number of other related documents such as maintenance forms, drawings, and so on.

The ENVOX forms system mode is used to create device definition, global items, and points. Forms are also used to verify configuration data and generate configuration download files. Each form includes one or more prompts with blank fields in which the information for each field is entered as necessary. Many fields provide a list of valid selections that may be accessed through the Values List Key.

See *Display* and *ENVOX Diagnostics Program*.

form logo merge
A tool provided as part of the IIS applications set to add a corporate logo to the datasheet forms. The logo must be in AutoCAD ⋆.DWG file format to be placed onto the datasheets.

formulator
The plant employee responsible for creating batch recipes.

form view
Appears as a series of data entry forms that permit the user to view and edit device specific information.

Fortran/FORTRAN
Formula Translation: a high-level, procedure-oriented computer language designed for the solution of mathematical and logical problems. The principal use of FORTRAN is in engineering and scientific programming.

four-bit discrete
A PROVOX® point type containing a mix of input and output and generated by the multiplexer (MUX), data concentrator unit (DCU) or programmable controller interface unit (PCIU). A four-bit discrete point either receives four discrete input values or generates four discrete output values. The console uses a four-bit discrete in the Maintenance Point.

fourth variable (FV)
The fourth of the HART-defined measured or derived dynamic variables accessible by HART commands from a smart field device. In most cases, the fourth variable (FV) contains information associated with the process being measured and reported in the primary variable (PV).

See *Dynamic Variables*, *Non-Primary Variables (NPVs)*, *Primary Variable (PV)*, and *Process Variable (PV)*.

FPLATLIB.DXF
The AutoCAD DXF file that contains the faceplate library. The Graphics Toolkit software uses this file when converting a display drawing DXF file to a PDF file.

FPREG
Acronym: Floating Point Register.

frame
A group of contiguous bits.

The structure of the set of characters or bytes making up a single complete message. A frame is composed of a number of fields containing separate items within the message (address, data, and so on). The sequence of fields forming the frame is part of the protocol specification.

frame check sequence (FCS)
A code that is used to determine whether a frame was sent correctly.

frequency distribution
The number of times each outcome was observed for a sample drawn from a statistical population.

frequency distribution chart
A chart representing a set of intervals, usually adjacent and of equal width, into which the range of a statistical distribution is divided, each associated with a frequency indicating the number of measurements in that interval.

frequency shift keying, phase coherent (FSK)
1. The type of signaling used on the PROVOX® Highway II communications system. In this type of signalling, the frequency is raised or lowered to represent binary ones (1), binary zeros (0), or non-data. The frequency changes only on the zero voltage crossing.

2. A method of modulating digital information for transmission over paths with poor propagation characteristics. Two different frequencies represent 0 and 1, usually in the audio frequency range (300 to 3000Hz).

HART protocol modulates an FSK signal onto a DC current.

friction feed
The means by which a printer moves paper with rubber rollers.

friction rollers
Rubber rollers that move paper through the printer.

frozen tags
A special status that can be applied or removed to all editable tags.

FSK
Acronym: Frequency Shift Keying, phase coherent

FST
Acronym: Function Sequence Table

FTIM
Acronym: Filter Time Constant

FUDGE
Acronym: Fisher Universal Documentation Graphics Editor

full duplex communication
Simultaneous transmission in both directions over a communications channel.

full-function link
A PROVOX® communication channel that supports both unsolicited and request/response information to and from other devices on the data highway. Use this type of link for the RS/6000 host computer that has the CHIP kernal with database and programming library. Full function links are assigned to communication channel 1 on a Type DH6021 NIU or Type 6032 HDL.

function
A command or call within a CHIP program that resolves itself to a value.

function sequence table (FST)
A list of controller instructions to perform specific logical and mathematical operations in a specific order. An FST resembles a sequence of programming subroutines, but defining an FST does not involve actual computer programming.

fuzzification
The process of converting an absolute variable like 78-degrees F into *fuzzy* variables like warm and cool. This conversion is the initial step in a fuzzy logic controller. This conversion process is accomplished using Membership functions.

fuzzy controller
A software device that uses a fuzzy logic control algorithm to automatically regulate a process variable.

fuzzy engine
An inference engine that evaluates rule based on *fuzzy* variables.

fuzzy logic
A reasoning process that determines outputs based on input conditions having varying degrees of truth.

FV
Acronym: Fourth Variable

F-value
A statistical value comparing the variance of the actual values with the variance of the predicted values for one output variable. The equation is:

$$\text{F-value} = \frac{Sp^2}{Sa^2}$$

where S2 is the variance. The F-value should be around 1.0. A number much different from 1.0 indicates a poor fit in magnitude. The problem is analogous to an analyzer where a high F-value means the span is set too high, and a low F-value means the span is too low.

FWD
Abbreviation: Forward

G2
A real-time expert system developed by Gensym Corporation.

G2 attribute table
There are four types of G2 attributes: constant attributes, whose values do not change; variable attributes, which get their values from variables; parameter attributes, which get their value from parameters; and object attributes, which are themselves objects. Constant, variable, and parameter attributes can have one of four types of values: numbers, truth values, symbols, and text.

See *Attribute*.

gain
1. The ratio of output change to input change in a controller. The amount of gain determines how much the controller output initially changes in response to process deviations.

2. The magnitude of change in output of a process that results from a change in input to the same process. Gain is normally expressed as a ratio. In a control loop, the gain is the product of the gains of each element in the loop. The controller would be just one of these elements. Each element contains a static component and a dynamic component.

GEN
The Recipe Manager type of unit variable that contains a value that can be changed only in the base grade of a recipe.

general configuration
Includes editing job information, adding or deleting user defined columns, creating/changing unit sets, editing form names, merging form logos and forms customization.

general protection fault (GPF)
When a Windows program attempts to access memory or resources it has not been allocated, the system gives a general protection fault message. When this occurs in an application, the application should be closed and then restarted.

general purpose interface bus
An industry-standard parallel interface that specifies a connection method between microprocessor systems and certain types of instrumentation.

general recipe
The highest conceptual and least detailed level of a recipe; usually for corporate use; contains general information that is independent of site or specific equipment.

generate
An ENVOX® configuration function consisting of two steps:

First, this function checks for errors in unverified configuration data in the device. This check ensures that all necessary information is in the configuration database and that all references from other devices and their points are configured correctly.

Second, after checking the data, the ENVOX software organizes the device's related data into a database table. The software then processes the data so that it can be downloaded to the device.

See *Download*.

GND
Abbreviation: Ground

GPF
Acronym: General Protection Fault

GPIB
Acronym: General Purpose Interface Bus

grade
A variation of the recipe formula values that produces a unique product. There can be 50 grades for each recipe.

grade parameters
Values that define quantities of ingredients, times, temperatures, and other variables in a batch recipe.

graphical user interface (GUI)
A communication method between a computer and users that depends on graphical objects such as windows, menus, and icons. Users access software functions by manipulating the graphical objects.

graphic cursor
This number corresponds to the means by which the graphic cursor will move each time the ← or → keys are pressed.

Since it is possible to display several thousand samples in a single trace, moving the cursor one sample at a time is very time consuming. Therefore, each time the ↑ key is pressed, the number of data samples the graphic cursor will move is doubled. After moving the ↑ once, the graphic cursor moves two samples. Pressing the ↑ key again causes the graphic cursor to move four samples, and so on.

The ↓ key resets the graphic cursor interval movement to single samples.

graphics server
The Intelligent Sensor Toolkit uses the Pinnacle Publishing, Inc.'s Graphics Server DLL for displaying charts. If the graphics server icon appears on the main window screen, and the Intelligent Sensor Toolkit is not running, simply delete the group.

GRD
The type of Recipe Manager unit variable that can contain a different value for every grade of a recipe.

ground
1. A voltage reference point in a system that has a zero voltage potential.

2. A conducting connection between an electrical circuit or equipment and either the earth or some conducting body that serves in place of the earth.

group
A PROVOX® point type. A group point controls as many as 8 DCD points, so that the points work in unison. A Group point uses a Group template which contains as many as16 setpoints for driving DCD point setpoints. The user defines group templates as part of system configuration.

group display
A set of 12 point faceplates that appear together on a PROVOX® console screen, so that an operator can see at a glance the most important information about 12 different points. During system configuration the user establishes the number of group displays, and which point faceplates compose each group display.

group template
A collection of setpoint values defined for a group point. For each group setpoint, the group template specifies a unique combination of setpoints for the individual DCDs which are subordinate to the group point. The use of a Group template makes it possible for the same Group point to use different combinations of DCD setpoints at different times, and also allows multiple Group points to use the same DCD setpoints by referencing a common DCD template.

GSI
Acronym: G2 Standard Interface

GSI base process
The portion of the GSI code written in LISP that is incorporated into the G2 program. The GSI base process is responsible for opening a communications path via ICP to the GSI extension process and to receive data from the extension. This base process also must inform G2 of the data received from the extension process.

GSI extension process
The portion of the GSI code written in C that communicates with GSI base process and ESDS. This portion's job is to forward requests from G2 to ESDS, take the data from ESDS and report it to the ICP connection with the GSI base process.

GSI variable status
An attribute of all GSI sensors in G2, whose value represents the current condition of data retrieved by ESDS.

See *Attribute* and *Sensor*.

GTCONFIG.COM
The Graphics Toolkit VAX COM file included with the software that overwrites logical definitions in the FISHERGT.COM file. The utilities PFXPDF and PDFPFX use this file. Note that if creating such a file, the file does not have to be named GTCONFIG.COM.

guest ID
A non-privileged ID obtained by leaving the user and password fields blank when logging on to IIS. A Guest is only allowed to view data.

GUI
Acronym: Graphical User Interface

half duplex
Communications in both directions (transmit and receive), but in only one direction at a given instant.

hand-held communicator
See *HART Communicator*.

handshaking
A method used to control communication to prevent overloading the receiver. Handshaking might consist of a defined sequence of special characters or messages, or may use separate control signals (as in RS-232-c). Without handshaking, the receiver must always be ready and able to accept a message.

HART protocol does not use handshaking beyond what is defined by the sequence of messages making up a transaction procedure. (HART messages are short enough to be received and stored in a temporary buffer, if need be, to be dealt with later).

hardcoded
A type of intelligent sensor function sequence table (FST) for a PROVOX® system. All types of exported intelligent sensors except parameterized FSTs are hardcoded. Hardcoded means that the scaling factors, limits, and weights are unchangeable constants in the program. The only way to change one of these constants is to overwrite the program with another version of the program.

hard disk
A magnetic storage medium with a large data storage capacity (as compared to diskettes) on platters housed permanently within the drive.

hardkey
A named keyboard key used to enter information or to access, select, or perform a specific function. An explanation of the hardkey's acronym or function immediately follows the first reference to it in the text. Hardkeys usually are referred to simply as *keys*, but occasionally as *buttons*.

hard manual mode (HMAN)
A special control mode associated with controller backup: in some PROVOX® systems, if a controller fails, additional hardware lets the operator retain manual mode control of the loop output.

HART
Acronym: Highway Addressable Remote Transducer

HART_CHANNEL utility
The CHIP HART CHANNEL utility allows the user to disable and re-enable digital communication originated by a Type CL6826 Smart Device Output Card channel.

Currently, this utility needs to be used only when specific FIELDVUE ValveLink™ software off-line diagnostics are being run on a PC connected at the termination panel or to the FIELDVUE valve itself.

HART Communication Foundation
The organization that establishes goals, sets policies, and acts as the official source of information worldwide regarding HART communication technology.

HART communicator
The Fisher-Rosemount Systems Model 275 HART Communicator is the hand-held interface that provides a common communication link to all HART protocol-compatible, microprocessor-based devices.

HCF
Acronym: HART Communication Foundation

HDF
Acronym: Historical Data File

HDL
Acronym: Highway Data Link

HDLC
Acronym: High-Level Data Link Control

header
Information about the purpose, source and version of the recipe such as recipe and product identification, originator, issue date, and so forth.

hertz
Unit of frequency measurement in cycles per second (cps).

Hewlett-Packard
A manufacturer of mini- and microcomputer systems. PROVOX® custom, batch, and large database consoles use the HP1000E series CPU and the custom computer uses the HP1000F series CPU.

Hewlett-Packard interface bus
An interconnection protocol used by Hewlett-Packard when describing the interface used with the HP7906H disk drive unit in the Type DC6541 Console Disk Unit.

hexadecimal or Hex
A base-16 number system commonly used in digital computers. This system consists of the numbers 0 through 9 followed by the letters A through F, where A corresponds to a decimal (base 10) value of 10 and F corresponds to a decimal value of 15.

hidden layer
Each output of the input layer is multiplied by a weight factor and sent to a neuron in the hidden layer. Each hidden neuron in the hidden layer sums the inputs and outputs the result of a transfer function, which is usually nonlinear.

hidden neuron
An element of the hidden layer, where the Intelligent Sensor Toolkit uses a centered sigmoid function. A synonym for hidden neuron is hidden node.

HIEC
High Engineering Units Scale Factor

hierarchy of classes
The organization of G2 classes into superior and subordinate levels. Each class in the hierarchy has one immediate superior class and any number of subclasses.

See *Class, Hierarchy of Classes,* and *Superior Class*.

high engineering units scale factor (HIEC)
A floating-point number that represents the upper limit (100 percent) of the anticipated range of an analog process variable.

high-level data link control
A device permitting data access and operation of a PROVOX® custom, batch, and large database consoles uses the HP1000E series CPU, and the custom computer uses the HP1000F series CPU.

highlighted
In Windows, indicates that an object or text is selected and will be affected by the next action. Highlighted text appears in reverse video or changes color.

high-low signal selector
A type of primary control algorithm that accepts as many as four analog input values, then selects the highest or lowest value to be the output value. (The operator determines whether the algorithm selects the highest or lowest value.)

high scale value
A value that is used as the upper limit of the vertical (Y) axis. A data sample equal to the high scale value will be drawn at the upper boundary of the plot area. Data samples larger than the high scale value are not displayed. The high scale value defaults to the *High Value* entered for the source historical data file member. This value may also be changed when a trace is added using the Y-scale function.

highway
See *Data Highway* or *PROVOX Highway II*.

Highway Addressable Remote Transducer (HART)
The international standard protocol by the HART Communication Foundation for analog communication with smart devices in process industries.

Highway Data Link (HDL)
A device that serves as a communications interface between a host computer and other devices of a PROVOX® instrumentation system over the system's data highway.

Highway Interface Unit (HIU)
A device permitting data access and operation of a PROVOX® instrumentation system by other manufacturer's computer systems.

See *CHIP*.

histogram
A graphic representation of a frequency distribution. The range of the variable is divided into a number of intervals of equal size, called cells, and an accumulation is made of the number of observations falling into each cell. The histogram is a bar graph in which the horizontal axis carries the values of the data series and the vertical axis carries the frequencies with which those values occur.

historical data file (HDF)
A data historian file used for historical data storage.

historical trace
A trace whose End TIme is earlier than the most recent sample in the source historical data file. The entire window represents a time period in the past. Historical traces attempt to fill the entire plot area with data bounded by the *Begin* and *End Times*. Historical traces do not automatically update.

historic read data
Collected from the Data Historian retrieved archive HDF (HDF 0).

historic write data
Collected from the Data Historian HDF's Valid HDF numbers range from one through 300.

history
A set of previous values for a variable or parameter. Each value is stored with the date and time that it was collected.

history identifier (ID)
A text string that identifies an array of historical data for a data file member.

history information
Includes arrays of data for specific operating parameters.

history/21
The data historian included in the Industrial Systems, Inc. (ISI) CIM/21 product.

HIU
Acronym: Highway Interface Unit

HMAN
Abbreviation: Hard Manual Mode

horizontal scalability
The ability to have multiple IIS servers, multiple clients running on the same network, or both.

host (computer)
The primary computer in a multi-element system, typically serving target or object computers. The primary computer usually issues commands, has access to the most important data, and is the most versatile processing element in the system.

HP
Acronym: Hewlett-Packard

HPIB
Acronym: Hewlett-Packard Interface Bus

HP-UX
Hewlett-Packard's version of the UNIX operating system.

hub
A device that isolates each device connected to it, so that if one device fails, other devices are not affected.

hybrid
A term applied to a signal or device that uses both analog and digital representation of data.

hyperlink
A style of text, such that when selecting highlighted items, a screen containing that item appears.

hysteresis
A deadband which must be exceeded before the input will affect the output.

HZ
Abbreviation: Hertz

I
Abbreviation: Integral (Reset) Control Action

IAC
1. Acronym: (adjective) Interactive
2. Acronym: (noun) Interactive Controller

IC
Acronym: Integrated Circuit

ICA
Acronym and IBM mark: Industrial Control Architecture

icon
A graphic representation of a software window or function. The iconization of a window helps unclutter the display workspace.

icon menu
A Graphics Toolkit display menu that offers choices represented by drawings rather than text. This feature requires a display that supports the Advanced User Interface.

ICP
Acronym: Indirect Control Point

IDI
Acronym: Intelligent Device Interface

IDL
Acronym: Inter-Driver Link

IEC
Acronym: International Electrotechnical Commission

IEEE
Acronym: Institute of Electrical and Electronics Engineers

IFC
1. Acronym: Integrated Function Controller
2. Acronym: Input File-Card-Channel

IFCC
This remote detail display parameter (DDP) attribute, 237:IFCC, indicates the input file-card-channels connected to the point. Occurrences 0 through 16 are valid for this read-only DDP. This attribute may be accessed using occurrence 0 for point types that have a maximum of one occurrence of this DDP.

I flag
In the ENSTRUCT software: a display indicator next to the graphic symbol for an element that indicates an interlock condition exists. The operator can see these interlocking conditions on an interlock display. Maintenance personnel can bypass interlocks using TUNE MODE or CHIP.

IIS
Acronym: Instrument Information System™

IIS client workstation software
The software that performs all of the functions identified in *Using Type FMS101 Instrument Information System™*. All IIS users require this software to use IIS. This software, however, is not required to be installed if only IIS Configure or Import/Export Utility is to be used.

IIS configure software
The software that performs the IIS configuration related functions identified in the *Configuration Manual*. Only the system administrator would normally use this utility.

IIS form logo merge utility
The software to perform the IIS datasheet merge logo functions identified in the *IIS Form Logo Merge* section of the *IIS Configuration Manual*.

IIS form set
A comprehensive form set that provides device description, tag revision based printed output, and dimensioned unit information.

IIS form table software
The software to perform the IIS multi-tag datasheet form manipulation related functions identified in the *IIS Form Table Manual*.

IIS import/export software
The software that performs the IIS data import and export related functions identified in the *IIS Import/Export Manual*. Only the system administrator would normally perform IIS data imports, while users may use this utility to perform IIS data exports.

illegal operation code (ILOPCD)
A code indicating that an operator attempted to carry out an improper operation.

I-lock
Abbreviation: Interlock

ILOPCD
Acronym: Illegal Operation Code

impedence
A complex ratio of a force parameter to a related velocity parameter; for example, a characteristic impedance is the ratio of voltage to current of a signal on a cable.

implied valve position or pressure (IVP)
The output of a primary control algorithm (PCA) or a smart field device. The IVP either determines how much to open a valve actuator, which moves to a position, or determines the pressure of a transducer. Note that if the IVP is modified by a station function or FST after being computed by the PCA, the valve output and the IVP will not be the same.

import
1. For ENVOX® software: moving CDV files into the configuration database.

2. For Recipe Manager software: copying a recipe from an archive in another database to the current database.

INAC
1. Abbreviation: Inactive

2. Acronym: Increase To Close

INC CLO
This remote detail display parameter (DDP) attribute, 10:INC CLO, shows FIELDVUE variable 74, increase to close, as a yes (increase close) or no (increase open). This tunable DDP is used to enable or disable the output signal inversion (based on actuator type) from a PROVUE® or Operator Workplace console.

IND
Abbreviation: Indicator

indicator
1. An instrument that graphically shows the value of a variable.

2. A visual readout of a measurement, condition, or operating mode of a device, or an alarm to get someone's attention.

indirect control point (ICP)
A regulatory controller point type which is composed of a set of analog or discrete values. These values may be displayed at a console, but are not used to directly control a process.

indirect measurement
A procedure performed by some smart field deivces that converts a measurement sent in one unit of measurement, such as pressure, to another unit of measurement, such as gallons. For example, a differential pressure transmitter used to measure gallons might actually be reading pressure. The transmitter sends the number of gallons in terms of pressure and the system converts the pressure to gallons. This action is considered an indirect measurement.

industrial control architecture (ICA)
A group of basic principles that guided the design of several IBM computers. The acronym ICA is an IBM mark.

.in file
Input sample file.

information stream
The first stream in a CDV file.

initialize
The process of bringing the software to a state where it accepts a configuration from the ENVOX database, or accepts a self-download; typically, part of boot up.

initial model file
The initial model file in the *Design Number of Hidden Neurons* and *Train* operations is an optional parameter. If the architecture of the initial model file does not match the required architecture, the operation will still work. If there are too many weights, the program simply discards the excess weights. If there are too few weights, the program randomizes additional weights. As an alternative to using an initial model file, select **RANDOM** to use random weights.

input layer
The first layer of a neural net, which is composed of input neurons.

input neuron
An element of the input layer, which reads in a raw input value.

input/output (IO or I/O)
Signal reception and transmission, or signal interfacing. Input, for a process control device, involves accepting and processing signals from field devices. Output, for a process control device, involves converting commands into electrical signals to field devices.

input sample rate
The rate at which the data historian sampled the input data. The rate times the *scan rate multiplier* gives the rate at which the intelligent sensor is to execute, called the *network execution rate*.

insertion loss
The amount of loss when a signal goes through a tap.

INSTCOMN table
Main index table for Table View.

Institute of Electrical and Electronic Engineers (IEEE)
An independent technical organization that defines standards for the electrical, electronic, and computer industries.

instruction
1. In data processing, a statement that specifies an operation and values or locations of its operands.

2. An individual function of a function sequence table (FST), which is an algorithm that runs under a logic control point (LCP). Individual instructions are entered on the ENVOX® LCP FST form using the Instruction Editor. Instructions are linked together to create a control strategy.

See *Command*, *Function Sequence Table (FST)*, and *Operation.*

instrument function
Part of the tag number; indicates the function performed by a device.

instrument function/group
Letter codes representing a set of related instrument IDs. Loop numbering is dependent upon instrument group, the type of loop numbering, and the location of a tag.

instrument ID
Consists of two or more identification letters. The first letter (or instrument group) is a general classification of what a device does, and the subsequent letters (or functional identifiers) specify what the device does in more detail. The instrument ID components have a number of different naming conventions, and IIS has standardized on the definition above.

instrument information
All of the information associated with a physical instrumentation device. This information includes the tag number for the device, common information between all devices, device specific information, and other associated information for the device (such as loop drawings, and so on).

instrument mode
A selected state for operating a FIELDVUE instrument; for instance, OUT OF SERVICE.

See *Mode*.

Instrument Society of America (ISA)
A professional organization of designers, manufacturers, and users of process control instrumentation that defines standards for the process control industry.

INTEG
Abbreviation: Integrity

integer
1. A positive or negative natural number, or zero.

2. A PROVOX® point type. An integer point reads a series of electronic pulses or switch closures, receives a 16-bit unsigned integer input value, or generates a 16-bit integer output value. An alternate name for integer point is pulse count input (PCI) point.

3. In the HART protocol, integers are transmitted as 8,16, or 24 bits, and are always regarded as unsigned (that is, positive).

integral (reset)
The time integral of the difference between process variable and setpoint values, used to obtain a small change in output in response to a large change in input.

integral (reset) control action
Control action in which the output signal is proportional to the time integral of the error signal (the difference between the process variable and the setpoint). This control action continues to change the output until the error signal equals zero or until the output reaches the maximum for the system. Reset action is another name for integral control action.

integrated circuit
A circuit element that incorporates transistor, diode, and resistor elements in the same semiconductor chip.

integrated function controller (IFC)
An advanced function controller of the unit operations controller plus (UOC+) family, that provides multiloop continuous control capability with interlocking and sequencing through the use of function sequence tables (FSTs) and logic control points (LCPs).

integration
1. The act of forming, uniting, or incorporating into a functioning or unified whole.

2. The operation of finding a function whose differential is known.

3. The operation of providing an output that is a time integral function of the measurand.

integrity (INTEG or INTG)
Soundness of performance; unimpaired condition.

See *Integrity Point*, *Integrity Level*, *Integrity Status*, *Display*, *ENVOX® Diagnostics Program*, and *Faceplate*.

integrity error level
See *Integrity Level* and *Integrity Status*.

integrity level
One of five default or configured labels (CRITICAL, URGENT, WARNING, MINOR, or NONE) used to indicate the severity of a smart error state reported to the controller.

When a smart error state is reported, the integrity level is displayed as a status message on the console's integrity point faceplate, and ENVOX diagnostic displays show the integrity levels for the Smart Device Input Card or Output Card, and its specific channels.

See *Integrity Point*, *Integrity Status*, and *Smart Error State (SES)*.

integrity point
A PROVOX® point type. An integrity point monitors the performance of a UOC family controller, coding status information into three eight-byte ASCII values, seven integer values, and two one-byte words.

integrity status
Each of the 16 smart error states has an associated integrity status and process status. Integrity status is defined by a hierarchy of five integrity levels, one of which is communicated to the integrity point to indicate the severity if a smart error state is reported.

See *Integrity Point*, *Integrity Status*, and *Smart Error State (SES)*.

Intelligent Communications Protocol (ICP)
The protocol G2 uses to share information and distribute control among G2s and other real-time knowledge-based applications.

intelligent sensor
A key use of neural net technology that rapidly computes a predicted variable that is difficult or impossible to measure on-line. An intelligent sensor might totally replace measurement of a sensor, redundantly backup an existing sensor, or give more frequent estimates of variables that are measured only every few hours.

intelligent tuner
Type ACS401 Intelligent Tuner is a Fisher-Rosemount Systems product that tunes process control loops.

interactive controller (IAC)
A regulatory controller, available in a PROVOX® instrumentation system, that handles from one to eight control loops.

interactive user-session memory
Memory used when logging in to the system. Multiply the amount of virtual memory used for an application by the total number of expected *simultaneous* users of that application to calculate the amount of memory required in a typical user session for the application.

inter-driver link (IDL)
A physical and logical connection between the I/O drivers of two controllers, for transporting configuration and operating data between the active and backup controller.

interface
An electronic circuit that governs the connection between two devices and helps them exchange data reliably.

interlock
A function within the ENSTRUCT software that prevents certain defined control actions through the use of interlock condition definitions. For example, not allowing a pump to start if a related tank level is below a certain amount.

International Consultative Committee for Telephony and Telegraphy (CCITT)
The international organization that develops compatibility and other recommendations for telecommunications, including data communication. (The acronym comes from the organization's French name.)

International Electrotechnical Commission (IEC)
An international group developing standards and certification in electronics and electrical engineering.

International Standards Organization (ISO)
An official body that develops standards for data communication and interconnection of different manufacturers' equipment.

interrupt signal
A signal that notifies the MPU that some event has occurred. In many systems, the interrupt signals have different priorities, and an interrupt priority control circuit sends the signals to the MPU.

INTG
Abbreviation: Integrity

intrinsic safety
1. A method for safe operation of process control instruments that keeps electrical energy so low that ignition of a hazardous atmosphere cannot occur.

2. Safety protection that restricts electrical energy within a device and its interconnecting wiring to prevent sparking or heating, leading to a potentially explosive atmosphere.

inverse response
The dynamic characteristic of a process in which the initial response to an input change moves in one direction for a period of time and then reverses so the the process finally settles out in the other direction. An example of inverse response is described below:

Boiler-steam drum level control consists of an inverse response named *shrink* and *swell*. In this example, boiler feedwater is added to the drum to control the level as steam is removed. Level instruments measure the liquid level in the drum. However, the liquid phase contains bubbles of steam that have not yet disengaged from the water. As steam flow increases, the level should fall. However, in the short term, pressure falls causing the steam bubbles to expand producing an increase in the level. Conversely, as feedwater flow is increased, the level should rise. However, the feedwater is typically below the boiling point of the water in the boiler causing the steam bubbles to collapse. The result is that, in the short term, increasing feedwater flow causes a reduction in level.

IO or I/O
Acronym: Input/Output

I/O channels
Input/output channels: communications paths from a device to a communications link or other device.

IOFVAL
Acronym: I/O Fail Value

This remote detail display parameter (DDP) attribute, 239:IOFVAL, is used to show the I/O fail value as a floating point number. This value is a single-occurrence DDP, which is tunable.

IOSTAT
Abbreviation: I/O Status

1. An IOSTAT instruction in an FST step reads the integrity status and process status of a configured channel on a Smart Device Input or OUtput Card. The process status is accessed on a variable-by-variable basis, whereas the integrity status is only needed at the card level.

2. This point attribute, 135:IOSTAT, allows the status of the input parameter of a process control point to be accessed. This attribute is available on all I/O channels connected to the point. If the I/O connection is to an analog field device, only the error bit is set if a channel has bad status.

See *Attribute (ATTR)* and *Function Sequence Table (FST)*.

I/P
Acronym: Input/output

IREG
Acronym: Integer Register.

ISA
Acronym: Instrument Society of America

ISA form set
The ISA form set provides a recognized standard form set, multi-tag datasheets and check box descriptions.

ISO
Acronym: International Standards Organization

ISO character set
A character set specified by the ISO committee.

ISO 9000
A set of standards prepared for the International Standards Organization, for achieving quality.

isolation
Separation between two or more circuits or cables to prevent electrical interaction or signal interference.

See *Barrier* and *Intrinsic Safety*.

ISTK
Acronym: Intelligent Sensor Toolkit

ISQL
SYBASE's stand-alone utility program for database's queries.

ISQL utility
Interactive SQL utility available in two flavors: command line DOS and ISQL for Windows.

item
A general term for an ENVOX® database entity. Items include device definitions, points, and templates.

IVP
Acronym: Implied Valve Position

job description
The job description is presented as the "description" within the database information portion of the Open Database dialog box in the IIS Client software.

job identification
IIS job identification is presented in the list of "database names" within the Open Database dialog box portion of the IIS Client software.

job information
An IIS database description created during installation that includes the project name (also called project job number), customer, contractor, site name and location, and describes the database being created. The job information appears to the user when selecting a database to log on to, and on every ISA datasheet printed by IIS.

jumper
An electrical connector used to select a particular signal path and bypass alternates on a printed circuit board. The jumper contains a connecting wire, usually within a small plastic rectangle with two receptacles that may be pushed down on a pair of pins sticking up from the board's surface.

K
Symbol: Fixed Gain

KB
Abbreviation: Keyboard

In unit operations, a word used to represent a specific value for a given point attribute.

KERMIT
A communications protocol with error checking that can be implemented on a variety of computers. This protocol is a useful method for downloading Rosemount Basic Language (RBL) files from a PC to an RS3 RBL controller. KERMIT sends the file name along with the files, and allows multiple files to be send output to a subsequent layer.

keyword
1. In ASCII configuration source files, a word or expression that begins a phrase. A few particular keywords constitute their own phrases, that is, have no operands. Most keywords, however, need operands to complete their phrases.

2. In unit operations, a word used to represent a specific value for a given point attribute.

kg
Abbreviation: kilogram

kilogram (kg)
Metric unit of mass.

knowledge base
The rules, objects, and graphical schematics and user interface items that compose an expert system application.

Kolmogorov-Smirnov Goodness of Fit Test (K-S Test)
A test based on comparing the distribution function of the hypothesized distribution with an empirical distribution function of the data.

K-S Test
Abbreviation: Kolmogorov-Smirnov Goodness of Fit Test

LAN
Acronym: Local Area Network

Large Database Console (LCON)
A PROVOX® console that allows as many as 10,000 points and 1000 displays. Typically, users keep 900 displays on the console hard disk for recall as requested. A smaller version of the LCON allows 2500 points and 250 displays.

last in, first out (LIFO)
An order for handling or processing items placed in a queue or buffer. The last item placed in the queue or buffer is the first item retrieved for use. A LIFO queue is often called a *stack*.

See *First In, First Out (FIFO).*

LCL
Acronym: Lower Control Limit

LCON
Acronym: Large Database Console

LCON interface unit (LIU)
A set of circuit cards that act as a protocol converter and message packer, allowing an LCON to interface to the PROVOX® data highway.

LCP
Acronym: Logic Control Point

LD
Acronym: Local Device

LDSV
An LDSV instruction in an FST step loads the signal value register with another high range value.

See *Function Sequence Table (FST)*.

least-significant digit (LSD)
The lowest-value position of an integer; used in the control panel of certain products.

LED
Acronym: Light-Emitting Diode

letter quality (LQ) printing style
Printer fonts that simulate the fully-formed characters produced by a high-quality office typewriter.

LGP
Acronym: Local Ground Point

License Personality Module (LPM)
The Operator Workplace Console Software licensing device.

LIFO
Acronym: Last In, First Out

light-emitting diode (LED)
An electronic component that generates a small focused beam of light, in response to a current passing through. LEDs are available in several colors, depending on the type of crystal contained.

line of perfect correspondence
In an XY (or scatter) plot, a 45 degree line corresponding to X=Y fits the input to output relationship.

linetype
The AutoCAD command that determines how lines appear (dotted, dashed, and so on). The Graphics Toolkit software supports only solid lines at this time.

link
See *I/O Channels*, *Open Systems Interconnection (OSI)*, and *RS-232-C*.

LIU
Acronym: LCON Interface Unit

LM
Abbreviation: Limit

LO
Abbreviation: Low

load
A software-initiated action on a database. The term refers to the SYBASE database load function and not the Open Database load utilities embedded in ENVOX® software.

load file
A specific type of data file used by the Documentation Toolkit software to load database information into AutoCAD drawings using a data link.

local area network (LAN)
A group of electronic devices that are relatively close to each other (usually less than two miles apart) and communicate with each other using a frequency range of several megaHertz. LAN communication includes a switching capability. A LAN has inexpensive communication media, such as coaxial or twisted-pair cable; usually the owner of the electronic devices also owns the communication media.

local condition
A TRUE/FALSE evaluation of a predetermined process state that exists in the same controller where the measured variable resides. These conditions can be logically associated, time dependent, or both. There are 320 local conditions per controller and three different types of conditions.

local device (LD)
Any PROVOX® device that resides on a local highway and can communicate directly with a local traffic director.

local ground point (LGP)
A central termination point for all signal common and power supply common circuits within a cabinet group of eight or fewer bays.

Local Highway II
A highway that is used to connect as many as 30 PROVOX® devices together into a logical token bus.

local point
A point that receives its parameter values from application programs resident on the host computer in which the point resides. With CHIP software, the parameter values of local points can be sent unsolicited from CHIP to other PROVOX® devices using CHIP's unsolicited transmit functionality.

local traffic director (LTD)
A communications device that controls the data flow on a local data highway. As many as 30 devices can be on the highway. An LTD also stores and forwards messages to other local areas.

location
A logical location in IIS software that refers to an internal database variable. This logical location corresponds to one or more physical locations in the real world. These logical locations are used for loop numbering.

locks
A software-initiated action on a database table. The database software locks tables that are being affected by a process. The ENVOX® administrator can determine which processes are locking which tables.

LOCN_ID
Internally within IIS, locations are associated with an internal index number field called locn_id. The locn_id is what IIS uses to maintain loop counters.

LOCN table
Table where location configuration is stored.

LOEC
Acronym: Low Engineering Units Scale Factor

log

1. A summary of process operation data, especially a list of significant events and the times of the occurrences.

2. A mathematical function, the inverse of the exponential operator.

log file

During installation, all system responses generated by the installation will be saved in a log file, if one has been defined.

logical device

A VMS file defined in the Recipe Manager software that contains one or more databases or transaction logs.

logical OR

A Boolean-algebra function in which logical (TRUE or FALSE) quantities form the elements being operated on. The logical OR function produces a TRUE output only when one of two (or more) inputs is TRUE. The logical OR Boolean expression is A+B.

logical ring

See *Logical Token Ring*.

logical token

A frame that is passed between highway devices giving permission to communicate on the highway.

logical token bus

A communications protocol in which one device on a highway transmits a frame (logical token) while all other devices on the highway receive the token sequentially, but only keep it if it is addressed to them.

logical token ring

1. A group of highway devices that pass a token to each other.

2. A communications protocol in which all devices on a highway can transmit and receive frames (logical tokens) simultaneously in a predecessor-successor arrangement.

logical unit (LU)

A conceptual entity that has no real physical existence. A common logical unit is a computer file: the data that makes up the file is stored in some physical device, but not necessarily contiguously. Users of PROVOX® systems define points and other logical units as part of system configuration; such logical units may have reserved portions of a hard- disk storage device for their data.

logical volume

Designated areas mapped by the operating system across one or more disks for databases and transaction logs.

logic control point (LCP)

A type of point used in advanced batch or multifunction controllers, such as unit operations controllers plus (UOCs+) and integrated function controllers (IFCs). An LCP calls a programmed subroutine defined by a function sequence table (FST). As configured, the LCP activates the FST in a continuous loop, as a single shot program, or as required as part of a control loop.

log off

A function in the IIS software that allows the user to log off the database server without terminating the IIS operation.

log on

1. The process of gaining access to a software program loaded onto a computer system.

2. Gaining access to IIS. The log on process validates the identity of a user by their log on ID and their password, ensuring only authorized people are using the system.

long frame

The HART protocol specifies a message structure in two formats, one short and the other long. Some smart field devices use the long frame format, while others may use the short frame format.

HART revision 5 introduces the long frame format. The long format provides extra security against acceptance of commands meant for other devices, due to external interference or excessive crosstalk. This format also expands the addressing capability to allow larger networks.

See *Master-Slave* and *Short-Frame*.

longitudinal redundancy check (LRC)

A system of error control that uses a check character containing an odd or even parity bit for the corresponding bits in each character of a message (usually including address, control characters and the real data). This system allows detection of multiple errors per character.

HART protocol uses LRC.

See *Exclusive OR (XOR)*.

loop

1. A control loop.

2. A UOC or IFC point type which provides control for a continuous process. In addition to basic regulatory control, loop points can also perform dead time compensation, override control, and various other complex control functions.

loop impedence

See *Impedence*.

loop location

An imaginary location used as a basis to manage parallel or serial loop counting in the ISA tag numbering system. A loop location may be associated with one or more physical (*real*) locations.

loop number

Usually a grouping of instruments working together towards a command function, such as controlling a valve.

low engineering units scale factor (LOEC)

A floating-point number that represents the lower limit (0 percent) of the anticipated range of an analog process variable.

lower control limit (LCL)

See *Control Limit*.

low scale value

A value that is used as the lower limit of the vertical (Y) axis. A data sample equal to the low scale value will be drawn at the lower boundary of the plot area. Data samples smaller than the low scale value are not displayed. The low scale value defaults to the *Low Value* entered for the source historical data file member. This value may also be changed when a trace is added by using the Y-scale function.

LPI
Acronym: Lines Per Inch

LPM
Acronym: License Personality Module

LQ
Acronym: Letter Quality Printing Style

LR
Acronym: Link Read-ROM (for PCON)

LRC
Acronym: Longitudinal Redundancy Check

LSD
Acronym: Least Significant Digit

LSP
Acronym: Last Setpoint

LTD
Acronym: Local Traffic Director

LU
Acronym: Logical Unit

LW
Acronym: Link Write-RAM (for PCON)

m
Abbreviation: meter (also spelled *metre*)

machine code
Instructions that consist exclusively of binary digits, which a microprocessor or computer can understand directly.

maintenance
A PROVOX® point type. A maintenance point indicates integrity of a system device to the system operator.

maintenance point
A PROVUE® console point type that indicates device integrity to the operator.

main window
The main window of the Console Software is divided into the following areas:

- main menu bar
- graphic display area
- instrument area
- alarm and OAR area

MAKELIST
The DOS-based Graphics Toolkit utility that creates a definition file.

MAN
Abbreviation: Manual Mode

management of change
The process of recording the changes that occur to instrumentation (as represented by the tag) over time.

man machine interface (MMI)
A library of terminal interface functions internal to Fisher-Rosemount Systems. Provides a *standard* way of presenting menu and form displays to the end-user.

manual loader
A type of primary control algorithm that passes a value from a field device to an operator (or computer), then sends a value the operator (or computer) supplies back to a field device without changing the output signal unless called upon to do so by an operator. This loader also allows an operator to monitor an input value from a field device.

manual mode (MAN)
A loop control mode: the operator directly sets the output of a control loop.

manual switchover
A redundant console switching procedure initiated at the the active console keyboard or from the configuration device's console diagnostics display to change the active status from one console to the other in a redundant pair.

map file
A specific type of data file used by the Documentation Toolkit software that defines either the structure of records or the set of key attributes in the load file or unload file, depending on the command invoked.

mask
See *Smart Variable Enable Mask*.

mask file
1. A specific type of data file used by the Documentation Toolkit software that defines either the structure of records or the set of key attributes in the load file or unload file, depending on the command invoked.

2. The PROFLEX® configuration software includes skeleton ASCII configuration source files for all point types, FSTs, and so on. To complete the configuration, copy and edit these files to reflect the process.

3. The ENSTRUCT software includes two additional sets of mask files. The mask files in the [.UTILITIES] directory are used by the AutoBuilder to create the ECF FSTs, VAR FSTs, displays, and so on that compose the database shell. The mask files in the [.UTILITIES.MASK] directory include the mask files used to implement continuous and batch control strategies.

master database
The central database which holds details of all of the other databases. Master database is created by SYBASE when SYBASE is installed.

master ground point (MGP)
A common termination point for as many as six local ground point (LGP) assemblies.

master keyword
In ASCII configuration source files, a keyword that starts a definition sentence. A colon ends each master keyword. *DEVICE:* and *POINT:* are the two most common master keywords.

master recipe
A recipe that refines a site recipe to include specific equipment information such as trains; considers equipment classes (equipment type).

master-slave
The master-slave structure of the HART protocol means that each message transaction is originated by the master (the PROVOX® control system) and the slave (smart field device) only replies when it receives a command message. The reply from the slave device will acknowledge that the command has been received, and may contain data requested by the master.

The HART protocol allows two active masters (the PROVOX control system and a hand-held communicator, for example) and up to 15 slave devices.

See *Multimaster*, *Primary (PRI) Master*, and *Secondary (SEC) Master*.

MAX
Abbreviation: Maximum

maximize button
A control button on an OSF/Motif Window Manager (MWM) window frame used to size the current window to the largest dimensions that can be displayed on the X Server.

maximum number of training epochs
A parameter in the *Options Customize* dialog box that tells the *Train* operation to stop when a specified number of epochs has been reached. This parameter also tells the *Design Number of Hidden Neurons* operation to stop when the specified number of hidden neurons is reached. The program resets the number of epochs to zero every time it starts a ~~new~~ choice of hidden neurons.

mb
Abbreviation: megabyte

Mbps
Acronym: Million bits per second

MCA
Acronym and IBM mark: MicroChannel Architecture

mean
The average values in a group of measurements.

measured variable (MV)
A physical quality or quantity which is monitored as part of a control strategy. Common measured variables are temperature, level, and rate of flow. The term *process variable* is a synonym.

median
The middle value in a group of measurements when arranged from the lowest to the highest. If the number of values is even, the average of the middle two values is typically used as the median.

median chart
A graphic representation of median values permitting a non-arithmetical plotting of sample values.

megabyte
A unit of computer memory size equal to approximately one million bytes (1,048,576 bytes).

membership function
In fuzzy logic, a mathematical function that relates the numerical value of an input or output to a degree of membership in a condition or state.

See *Singleton*.

memory
A computer's storage for programs and data. Most computers and microprocessors have both internal and external memories: use of internal memories is usually faster, but the capacity of internal memories is more limited. Internal memories are usually ROM or RAM; external memories are usually disk or tape drives.

menu
A window containing a list of selections, one of which is highlighted.

menu bar
The rectangular area at the top of the display containing the Console Software's function selections. Each function selection has associated pull-down and pull-right menus.

menu permissions
A feature of the IIS software package that controls access to the functionality of IIS.

menu permit
Permission to access IIS menus, granted by the System Administrator.

meter (m)
Metric unit of length.

MGP
Acronym: Master Ground Point

MicroChannel Architecture (MCA)
A group of basic principles that guided the design of the IBM RIC card. The acronym MCA is an IBM mark.

microprocessor
A complex integrated circuit that can be programmed to perform different tasks.

microprocessor unit (MPU)
A general-purpose integrated circuit that performs the functions of the central processing unit (CPU) of a computer.

microPROVOX™ products
The Fisher-Rosemount Systems' line of process control products used in microPROVOX self-contained process control systems.

microPROVOX™ Display Format
The ASCII tab-delimited intermediate file format for microPROVOX displays.

migrate
The process of converting PROFLEX® configuration data into CDV file format, from which the data can be imported into an ENVOX® database.

millimeter (mm)
Metric unit of length equal to 0.001 meter. Also spelled *millimetre*.

MIN
Abbreviation: Minimum

minimize button
A control button on a OSF/Motif Window Manager (MWM) window frame used to turn the display into an icon.

missing data
Input or output data that should exist but does not. The user can choose to have the program estimate the missing data, or the user might choose not to use observations with missing data.

missing data method
The user-selected method for handling missing input data. The choices are remove, interpolate, or mean. Remove means to treat missing data as bad data, and not to use observations that contain ~~any~~ missing data. This choice is advisable when a lot of samples are available. Interpolate means to fill in the missing values with the average of the previous and next values. Missing values will still be treated as bad if there are two or more missing values in a row. Mean refers to replacing the missing input value by the average of all input values for that variable. This method should be used with caution.

mm
Abbreviation: millimeter

MMI
Acronym: Man Machine Interface

mnemonic
A single character of a menu selection label that, if pressed, activates the menu selection when the menu is displayed.

mode

Identification of who or what controls changes to certain types of point data. Point data may potentially be changed by a human operator, a controller algorithm, a computer, and another point. Each mode determines which of these conditions is allowed to change point data. The seven possible modes in a PROVOX® system are: *manual, automatic, remote setpoint, supervisory, direct digital control, computer,* and *hard manual*.

See *Instrument Mode*.

mode (of a statistical sample)

The most frequently occurring value in a data series.

model database

The database which is used as the basis for another ~~new~~ database. The model database is created by SYBASE when SYBASE is installed.

model file

The neural net produced through training which contains not only the number of input, hidden, and output neurons and weights, but also the filter values and valid ranges for the inputs, hidden neurons, and outputs.

modem

1. MOdulator/DEModulator: A device that converts binary digit signals to and from a frequency shift keying (FSK) form. Most modems provide RS-232-C signal levels on the binary digital side. A modem does not provide a data coding mechanism, only a conversion of the physical form of the signal used.

2. The term is commonly applied to a box containing supporting functions, such as signal interface circuits, connectors, power supply, auto-dialing or auto-answering functions, and so on.

3. The term might apply only to an integrated circuit chip that performs just the main conversion tasks.

HART protocol-compliant field devices often use low-power CMOS modem chips.

modifier key

A key that, when pressed with a second key, changes the meaning of the second key. Common modifier keys include:

- Ctrl
- Alt
- Shift

modulation

The process by which a carrier signal is varied in some way to represent an information signal. This process allows accurate transmission of information, even over a signal path that might not not convey the signal in its original form.

HART protocol uses the *frequency shift keying* (FSK) method of modulating binary coded data onto a DC current signal.

See demodulation.

module

See *Analog/Smart Device Input Module*.

monitor
A PROVOX® point type. A monitor point is used to retain a single analog or discrete value. Analog monitored values are typically displayed on a console display as a PV bar graph. In a monitor point, the device containing the point is allowed to read or write the value and other system devices are only allowed to read the analog value.

monitor/deviation
A PROVOX® point type. A monitor/deviation point is used to compare two analog values, the process variable and setpoint, which are typically displayed on a console bar graph. The setpoint value is normally held constant and is compared to the process variable value which is allowed to deviate. Both values are actually monitor values, which means that the device containing the point is allowed to read or write the analog values and other system devices are only allowed to read them.

monitor/force
The ENSTRUCT software function that monitors as many as four conditions and forces some action when ~~any~~ one of these conditions becomes TRUE. The monitor/force function is included in the mask file MFORCE.MSK.

monitor-reference
A PROVOX® point type. A monitor-reference point is used to retain a single discrete value. The monitor-reference value can be written to or read by both the device containing the point and other PROVOX system devices.

monitor-reference register
A type of register used in an FST or a calculation. A monitor-reference register can be written into or read by both the device containing the register and other PROVOX® system devices.

monitor register
A type of register used in an FST or a calculation. A monitor register can be written into or read by the device containing the register, but other PROVOX® system devices can only read its value.

most-significant digit (MSD)
The highest-value position of an integer; used in the control panel of certain products.

Motorola, Inc.
A manufacturer of electronic components and microprocessors. PROVOX® devices use many Motorola integrated circuits and MPUs, including 8-bit (MC6809) and 16-bit (MC68000 and MC68010) machines.

mouse button
A button on a mouse or trackball that selects or activates an operate command for a selected item.

moving average
A forecasting method based on forming a ~~new,~~ smooth series by averaging groups of numbers in the original series.

MPC
Abbreviation: Model Predictive Control

MPU
Acronym: Microprocessor Unit

MS Access
A Microsoft (MS) database program that is useful for manipulating data. While this program has limited programming capabilities, it has excellent abilities to connect with other databases and is easy to use.

MSD
Acronym: Most Significant Digit

multidrop
A communication system in which more than two devices are connected on a single transmission medium. Each device must have an unique address so that it can recognize messages intended for that device rather than other devices.

HART protocol allows multidrop operations, with up to 15 slave devices on one pair of wires. Analog signals cannot be used in this mode, since these signals would simply add together in the common wiring. Each slave device is set at a fixed current value of about 4 mA to reduce power consumption.

multifunction key
See *Softkey*.

multimaster
A communication system that can have more than one master device. For this system to work, the masters need a specified way to allow each other an opportunity to transmit.

HART protocol is a simple multimaster system. After receiving a reply from a slave device, the master waits for a short time before starting another transmission. This system allows a second master to break in if it wishes.

multiplexer (MUX)
A PROVOX® highway device that transfers information between the data highway and field devices (both analog and discrete).

multiplexer analog input (MUX-AI)
A PROVOX® point type, available from the multiplexer. A MUX AI point consists of a single analog value that represents the voltage or current signal of a multiplexer analog input channel.

Custom consoles (CCONs) and custom computer (CCOMP) consoles also use this point type to define Computer/Highway Interface Package analog input (CHIP-AI) points.

Batch consoles (BCONs) and large database consoles (LCONs) use this point type to define multiplexer analog input (MUX-AI), CHIP-AI, and unit operations controller analog input (UOC-AI) points.

multiplexer analog output (MUX-AO)
A PROVOX® point type, available from the multiplexer. A MUX AO point consists of a single analog value, provided by a console operator or a system device, that appears as the voltage or current of a multiplexer output. Batch consoles (BCON's) and large database consoles (LCON's) also use this point type to define their internal (local) MUX-AO and unit operations controller analog output (UOC-AO) points.

multiplexer discrete input (MUX-DI)
A PROVOX® point type, available from the multiplexer. A MUX-DI point consists of a single-bit digital signal that is readable by the circuitry of a controller or multiplexer. BCON, CCON, CCOMP, and LCON consoles also use this point type to define their internal (local) MUX-DI, programmable controller interface unit discrete input (PCIU-DI), and data concentrator unit discrete input (DCU-DI) points.

multiplexer discrete output (MUX-DO)
A PROVOX® point type, available from the multiplexer. A MUX-DO point consists of a single-bit digital signal produced by the circuitry of a controller or multiplexer device under the control of the controller algorithm or console operator. BCON, CCON, CCOMP, and LCON consoles also use this point type to define their internal (local) MUX-DO, programmable controller interface unit discrete output (PCIU-DO), and data concentrator unit discrete output (DCU-DO) points.

multiplexer pulse count input (MUX-PCI)
A PROVOX® point type, available from the multiplexer. A multiplexer pulse count input (MUX-PCI) point is a single value, from 0 to 65535, representing the number of discrete pulses received at a multiplexer pulse count input channel.

CCON and CCOMP consoles also use this point type to define their internal (local) MUX-PCI and programmable controller interface unit pulse count input (PCIU-PCI) points. BCON and LCON consoles use this point type to define their internal (local) MUX-PCI, PCIU-PCI, and unit operations controller pulse count input (UOC-PCI) points.

multivariable (MV)
1. Able to represent one ~~any~~ of several variables; usable for ~~any of~~ several roles.

2. A PROVOX® point type. A multivariable point can be used for many different types of control, as configured. This point type also is called a multiple variable point. Multivariable points include accumulation points, EPCI points, integrity points, and logic control points.

multivariable controller
A controller with more than one controlled variable and one manipulated variable. The number of inputs and outputs of a multivariable controller do not necessarily have to equal each other. If this occurrence happens, the controller is *square*.

If the number of controlled variables exceeds the number of manipulated variables, then the controller is *constrained* and it may not be possible for each controlled variable to reach setpoint. If the number of manipulated variables exceeds the number of controlled variables, then the controller has available degrees of freedom. This environment is ideal for optimization.

multivariable interaction
In several processes, a change in one variable affects many other variables. At the same time a change in another variable may affect the same variables. This type of interaction is referred to as multivariable interaction and presents a major challenge for SISO controllers. Using decoupling logic or a model-based multivariable controller can overcome the obstacles presented by multivariable interaction.

multivariable point (MVP)
See *multivariable.*

MUX
Abbreviation: Multiplexer

MUX-AI
Acronym: Multiplexer Analog Input

MUX-AO
Acronym: Multiplexer Analog Output

MUX-DI
Acronym: Multiplexer Discrete Input

MUX-DO
Acronym: Multiplexer Discrete Output

MUX-PCI
Acronym: Multiplexer Pulse Count Input

MV
Acronym: Measured Variable or Multivariable

MVP
Acronym: Multivariable Point

NAK
Acronym: Negative Acknowledgement

name
1. A unique identifier for ~~any~~ devices or logical units of an operations console system except a point or a controller (points and controllers have tags instead of names).

2. A G2 attribute that provides one way to refer to an object, workspace, or other item.

See *Attribute*, *G2 attribute table*, *Item*, *Object*, and *Workspace*.

NAN
Acronym: Not A Number

NC
Acronym: Normally Closed

ND
Acronym: Network Device

negative acknowledgement (NAK)
A control signal that reports the reception of a data block with errors. This signal usually triggers automatic retransmittal of the data block.

nested triggers
Triggers that fire due to the operation of another trigger in a different table.

network device (ND)
A PROVOX® device that communicates directly with a network traffic director. A network device can be any device, but usually is one that collects information from several local highways. Local traffic directors, consoles, multiplexers, programmable controller interface units (PCIUs), data concentrator units (DCUs), unit operations controllers (UOCs), and trend units are common network devices.

network execution clock
In an RS3 implementation of an intelligent sensor, the network execution clock determines when the inputs to the network update.

network execution rate
The rate at which the intelligent sensor is to execute. This rate is a product of the *input sample rate* times the *scan rate multiplier*.

Network Highway II
A highway that is used to connect Local Highway IIs and Bridge Highway IIs.

network interface unit (NIU)
A device that lets a computer communicate with other devices of a PROVOX® instrumentation system, using the system's data highway.

network installation
When a network installation is selected, all of the software identified is installed on a server computer plus the installation files for the subsequent workstation users to install the workstation components. Select this installation type of the IIS client to run from a network server.

Network Operations Server (NOS)
A software option to the PROVUE® operator console. The network operations server uses the OSF Motif and MIT X open system windowing standards to create a distributed, windowed, graphical user interface based on the PROVUE console user interface.

network traffic director (NTD)
A PROVOX® device that controls the data flow for the network data highway. The NTD links network devices and local data highways using the local traffic directors.

neural net (NNET)
A mathematical function that predicts outputs given inputs. Its workings are based on a simplified model of the brain.

neural network
Synonym for neural net.

neuron
An element of a neural net. A neuron simply takes the sum of its inputs, performs a calculation, and produces one output. The three types of neurons are: input, hidden, and output.

See *Input Neuron*, *Hidden Neuron*, and *Output Neuron* for more information.

NIU
Acronym: Network Interface Unit

NNet
Abbreviation: Neural Net

NO
Acronym: Normally Open

node
A device having a unique address.

node address
The address of a piece of hardware on a computer network. DECnet addresses are in the form *n.nnnn*. TCP/IP addresses are in the form *nnn.nnn.nnn.nnn.*

node number
A number computed from the DECnet address of a node.

noise
Unwanted and typically random signal components that obscure the genuine signal information being sought.

non-conforming units
Units which do not conform to a specification or established standard. Systems producing these non-conforming, or defective, units are analyzed with p and np control charts.

non-conformities
Specific occurrences that do not conform to specification or established standards. A non-conforming, or defective, unit has the potential for more than one non-conformity. Systems producing non-conformities are analyzed with c and u control charts.

non-directional
Signal strength from a drop cable that splits equally in both directions on a tap onto the highway cable.

non-primary variable (NPV)
One of two types of HART-defined variables that smart field devices provide for host devices to access by HART commands.

Non-primary variables are determined by the smart field device vendors, and include all variables except the four dynamic variables.

See *Dynamic Variables*.

non-volatile memory (NVM)
A type of semiconductor memory that retains its contents even though power is disconnected.

normal distribution
A continuous, symmetrical, bell-shaped frequency distribution for variable data that underlies a variables control chart. When measurements have a normal distribution, approximately 68.26% of all individuals lie within plus or minus one standard deviation unit of the mean. approximately 95.44% lie within plus or minus two standard deviation units of the mean, and 99.73% lie within plus or minus three standard deviation units of the mean. Three percentages are the basis for control limits and control chart analysis and for many capability decisions.

See *Komogorov-Smirnov Goodness of Fit Test*.

normally closed (NC)
Said of a contact pair closed (conducting) when its device or relay coil is not energized. Such a contact pair also is called a break contact.

normally open (NO)
Said of a contact pair open (not conducting) when its device or relay coil is not energized.

NOS
Acronym: Network Operations Server

notch gain PI_PID
A type of primary control algorithm which is similar to a normal PI_PID algorithm, but allows the proportional gain to be changed while the process variable is in a certain region of its span (the notch).

NPV
Acronym: Non-Primary Variable

N-R
The type of Recipe Manager unit variable that contains a value reserved for the operation. The value is not returned to the console.

NSR
Acronym: Non-Self-Regulating

NTD
Acronym: Network Traffic Director

null
Having no assigned value. In a CDV file, null is represented as two commas with zero or more spaces in between.

number of epochs before restarting the training algorithm
The first iteration of a conjugate gradient algorithm is a steepest descent step. This parameter in the *Options Customize* dialog box tells the training algorithm how many epochs to do conjugate gradient before restarting with another steepest descent step.

NVM
Acronym: Non-Volatile Memory

OAL
Acronym: Operator Attention List

OAR
Acronym: Operator Action Request

object
A G2 application entity, such as a valve or a tank. Every object has an attribute table, which holds the characteristics that make the object unique. Objects may have icons. Further, every object is an instance of a class of objects.

See *G2 Attribute Table*.

ObjectBroker
A Digital Equipment Corporation software product.

object definition
Defines a class of G2 objects.

See *Object*.

object ID
A number generated by the ENVOX® software for the CHIP database.

observation
A set of data used to predict an output. An observation is analogous to a sample; however, a sample is data collected at the same time, while an observation is data, perhaps from different times, used to predict an output. There are no input or output observations; rather an observation contains both the inputs and actual outputs. Observations can be either used or unused. Used observations contain both good data values and corrected data values. Unused observations have at least one data value that is not good and not corrected. An observation is also unused if all of the data is usable, but a time delay crosses a separator boundary. Unused observations are not used in the *Design Inputs and Delays*, *Design Number of Hidden Neurons* or *Train* operations.

OCC
Abbreviation: Occurrence

occurrence
An individual parameter of an attribute.

octal
Involving eight characteristics, conditions, or possibilities. For example, octal numbers (0 through 7) have the base (radix) 8.

octet
An eight-bit byte.

OEM
Acronym: Original Equipment Manufacturer

OFCC
Acronym: Output File-Card-Channel

This remote detail display parameter (DDP) attribute, 238:OFCC, shows the output file-card-channel numbers as @F-C-C. Occurrences 0 through 8 are valid for this read-only DDP. This attribute can be accessed using occurrence 0 for point types that have a maximum of one occurrence of this DDP.

OFFSCAN
A local point detail display parameter (DDP) attribute, that allows the FIELDVUE shadow AO point (and other shadow points) to be turned off scan. When a shadow point is off scan, all changes, instead of being sent to the instrument, update the data in the controller directly.

OFFSCAN is a read-only, single-occurrence DDP. This attribute allows values to be manipulated manually so FSTs and Operations can be validated when FIELDVUE instruments are not available.

See *FIELDVUE Shadow AO Point*.

on/off controller
A controller that has only discrete output values: on or off.

OP AMP
Acronym: Operational Amplifier

open
In Windows, to display the contents of a file in a window, or to enlarge an icon to a window.

open systems interconnection (OSI)
The OSI reference model is a defined way of specifying and implementing a communication protocol in layers, each of which has a specific function. This model originated from the *International Standards Organization* (ISO). In an implementation, each function should be performed (if at all) in the layer, and the interfaces between layers should be well-defined.

Different OSI model-conforming protocols might not be able to inter-communicate directly. However, implementing gateways translating between different protocols should be easier than for non-OSI protocols.

HART protocol implements layers 1 (physical layer), 2 (data-link layer), and layer 7 (application layer). Layers 3 (network layer), 4 (transport layer), 5 (session layer), and 6 (presentation layer) are not relevant to this type of local network.

OpenVMS
Trademark of Digital Equipment Corporation for one of the firm's computer operating systems; an acronym for Open Virtual Memory System. OpenVMS provides an operating environment for technical applications of AXP and VAX computers.

operand
1. In a function sequence table, a value that modifies or qualifies a function.

2. In ASCII configuration source files, an expression, a simple operand, a phrase list, or an operand list.

operand list
In ASCII configuration source files, two or more operands separated by commas.

operating parameter
A parameter that appears in a point faceplate. Examples include process variable, setpoint, valve output (percent IVP), mode, and alarms.

operating state
The current condition of an activity, unit, LCP, or other element of a process-control strategy, with regard to the element's operation. Examples of operating states are: *active, failed, holding, idle, out of service,* and *waiting*.

operating system
The software that controls and supervises all of the internal operations of a computer.

operation
1. An instruction which defines how a process is executed with the equipment available; an independent action that runs on one unit and performs parts of a process.

2. For PROVOX® systems: See *Unit Operation*.

operational amplifier (OP AMP)
A high-gain, linear, DC amplifier, typically an integrated circuit, used in a wide variety of applications.

operation parameters
The 32 unit variables that contain default grade values. Operation parameters are common to all phases of an operation.

operator action request (OAR)
A notice of operator action required before an operation can continue. OARs appear in the faceplate for a unit point and in the OAL, in a format similar to that of alarms.

operator attention List (OAL)
A one-line console message that alerts the operator to displays that have points in alarm, batch units that require information, console errors, or communications problems.

operator session
The software interface to the Operator Workplace Console Software. The combination of windows and controls used to monitor and control the process.

operator station
1. A local control station that can be connected to regulatory controllers. An operator station displays most of the same information that appears in a faceplate display, and gives basic control over a control loop.

2. An Operator Workplace X-terminal, keyboard, logic module, pointing device, and optional alarm interface unit (AIU) where an operator monitors and controls a PROVOX® control system.

3. A generic term used interchangeably to identify either a desktop operator interface unit or a PROVUE® console bay in PROVUE console discussions.

Operator Workplace (OWP or WPCON)
Fisher-Rosemount Systems' family of PROVOX® console products designed for applications that require Open-Systems access to plant-wide information systems from a graphical windowing environment. The Operator Workplace console product line is based on open standards and enables real-time process management in the modern control room.

ENVOX® software uses the acronym WPCON (Workplace Console) in forms and menu options that are used solely to configure Operator Workplace consoles.

OPI
File extension for the operator interface portion of the microPROVOX™ configuration.

OPITOUDF
The Graphics Toolkit utility that converts microPROVOX™ OPI files to UDF files.

optical isolation
The technique of electrically isolating two circuits by converting an electrical signal to an optical signal and back again. Optical isolators commonly consist of an LED and a phototransistor mounted in a DIP.

optimization
The control strategy objective that consists of moving the process into an optimum state. The control strategy usually minimizes an objective function like production cost or energy consumption. Or, optimization maximizes an objective function like throughput subject to constraints. Optimization is usually applied as supervisory control and is limited by the performance of the first level stabilizing control.

original equipment manufacturer (OEM)
The firm that makes a product sold by another firm. For example, Hewlett Packard is the OEM for some products sold by Fisher-Rosemount Systems.

OR or ORed
See *Logical OR*.

OSF/Motif Window Manager (MWM)
MWM controls the size, placement and operation of windows on an X Server.

OSI
Acronym: Open Systems Interconnection

OS/2
The operating system software IBM uses in several models of computer. OS/2 is a mark of IBM.

OT
Acronym: Output Tracking

OUT
Abbreviation: Output Signal

.out file
Output sample file.

outlier
1. A value that is different from most other values. Some outliers are due to noise and gross errors, and are undesirable. Other outliers reflect different process conditions and are often desirable. The Intelligent Sensor Toolkit program uses the word outlier in this sense, and for data that is undesirable as defined in the second meaning for this term.

2. Input or output data values that are outside the control limits. Control limits can be set by a user to exclude values less than the lower control limit and greater than the upper control limit. If the **Default lmts** button is pressed on the **Preprocess** operation spreadsheet, the outlier limits are set to the mean plus or minus three standard deviations. Observations with outliers are deleted in the *Preprocess* operation. In the *Verify* operation, outliers are retained but marked as bad.

out of control
A process that exhibits variations exceeding the control limits, which indicates the presence of special cause effects.

output neuron
An element of the output layer. An output neuron takes the sum of its inputs. linearly scales them, and produces one output.

output node
Synonym for output neuron.

output signal (OUT)
A signal produced by a device, often per a program instruction or command, and typically used as the input to a different device.

output tracking
A technique commonly used in override or cascade control applications where an analog value read from the track signal value input of a controller is substituted for the IVP value calculated by the PCA.

overshoot
The persistent effort of a controller to reach the desired level, which frequently results in going beyond (overshooting) the mark. Overshoot is often expressed as a ratio or as an overshoot percentage.

overwrite
To write data to a memory that already contains information, replacing that information with other information.

OWP
Acronym: Operator Workplace

P
Abbreviation: Proportional Control Action (Gain)

packet (PKT)
A block of data, or message, handled by a communications network in a well-defined format. Packets in PROVOX® systems include headers and maximum sizes of their data fields.

PAL
Acronym: Programmable Array Logic

paradigm
Refers to the architecture and learning methodology for different types of neural networks. The most popular paradigm is back-propagation. Other paradigms include: radial basis, rho, and auto-associative.

parallel
1. Simultaneous data transmission on two or more channels.

2. In data transfer operations, a procedure that handles a multiple bit code, sending all bits simultaneously on a number of paths equal to the number of bits involved (often a byte of 8 bits).

See *Serial*.

parallel batch structure
Multiple processes that are eventually combined in another process.

parallel discrete monitor (PDM)
Former name for a discrete monitor (DM) point type.

parallel discrete output (PDO)
A PROVOX® point type. A PDO point generates values for as many as 16 discrete output channels, in the form of a binary value (0-65535) or binary-coded decimal value (0-9999). A common use for a PDO point is to control a hardware device that requires multiple discrete signals.

parallel interface
A data transmission device that provides a channel for each bit of a byte, thus permitting simultaneous transmission of all of the bits.

parallel interface adapter
An integrated circuit device that provides a number of parallel discrete input and output signals that can be controlled by the address and data signals of an MPU.

parallel loop numbering
Allows repeated loop numbers in a location as long as the numbers are repeated for different instrument groups.

PARAM
Abbreviation: Parameter

parameter (PARAM)
1. A G2 object that always has an available value and never causes data seeking. Contrast with *Variable*.

2. A quantity or property that is treated as a constant, but which may sometimes vary or be adjusted.

3. A definable characteristic of an item, device, or system.

4. A quantity in a subroutine whose value helps specify the process to be performed.

See *Attribute (ATTR)*, *Detail Display Parameter (DDP)*, *Display Attribute*, *Occurrence*, *Operating Parameter*, *Point*, and *Tuning Parameter*.

parity bit
A binary bit appended to the data bits in a character to make the sum of all of the bits always odd (odd parity) or always even (even parity).

The parity bit allows the receiver to detect single bit errors within the character. Correcting the error is not possible, since there is no way to know which individual bit was corrupted. Also, a single parity bit cannot guarantee to detect errors affecting more than one bit in a character.

HART protocol appends an odd parity bit to each byte transmitted. Further security against data corruption is provided by the message checksum.

See *Checksum*.

parameterized FST
A type of function sequence table (FST) neural net for a PROVOX® system. Parameterized FSTs do not contain scaling factors, limits, or weights. Rather, auxiliary FSTs store these values, and the parameterized FST merely references these values by reading them from the auxiliary FSTs with the DARD command. Neural net FSTs that are not parameterized are hardcoded.

parity check
A test for errors in transmitted data: checking whether the number of ones (or zeros) in an array of binary digits is odd or even.

partial download
The process of clearing designated portions of the configuration database and reconfiguring only those portions. A partial download causes only minimal disruption of current operations or active processes.

partial parallel tag numbering system
Allows repeated loop numbers in a location as long as the numbers are repeated for different instrument groups. Does not use the tag_prefx1 and tag_prefx2 fields.

partial serial tag numbering system
A tag numbering convention that Does not allow loop numbering to be repeated in a particular location for ~~any~~ instrument groups. Does not use the tag_prefx1 and tag_prefx2 fields.

Pascal/PASCAL
A highly structured, high-level computer language used for instructional, engineering, and scientific applications.

pass-through messages
A CHIP (version P4.2 or greater) software feature that allows a program to request and process detailed smart field device information without using the PROVOX® point structure. This feature also allows CHIP programs to execute transmitter-specific commands.

password
A unique word or sequence of letters or numbers assigned to one user by the Systems Administrator.

path
1. The stream between units that batch ingredients follow to complete a batch transfer.

2. The DOS statement to communicate which directories to look for data files. The maximum length of the path statement is 127 characters. However, since the first five characters must be **PATH**=, the maximum number of characters describing the files is 122.

3. The current path from the root directory to the fie. The maximum length of this path is 63 characters in DOS.

PB
Acronym: Proportional Band

PBM
Acronym: Push-Button Module

PC
Acronym: Printed Circuit, Programmable Controller, or Personal Computer

PCA
Acronym: Primary Control Algorithm

PCALHI
Acronym: Process High Range Limit

This remote detail display parameter (DDP) attribute, 226:PCALHI, shows the process high range limit as a floating-point number. This attribute is a single-occurrence DDP, which is tunable.

See *Calibration Block* and *PEU*.

PCALLO
Acronym: Process Low Range Limit

This remote detail display parameter (DDP) attribute, 227:PCALLO, shows the process low range limit as a floating-point number. This attribute is a single-occurrence DDP, which is tunable.

See *Calibration Block* and *PEU*.

PCI
Acronym: Pulse Count Input

PCIU
Acronym: Programmable Controller Interface Unit

PCL
Acronym: Process Control Language (CIM/21 term)

PCOMM
Acronym: PROVOX® Common Area

PCON
Acronym: Preformatted Console

PD
Acronym: Proportional/Derivative Control Action

PDC
Acronym: Process Dynamics Compensator

PDF
Acronym: PROVOX® Display Format

PDFACAD
The Graphics Toolkit utility that automates the conversion from PDF files to AutoCAD.

PDFENV
The Graphics Toolkit utility that automates the conversion from PDF files to the ENVOX® database.

PDFPFX
The Graphics Toolkit utility that automates the conversion from PDF files to a PROFLEX® configuration.

PDFTOCDV
The Graphics Toolkit utility that converts PDF files to ENVOX® CDV files.

PDFTODSE
The Graphics Toolkit utility that converts PDF files to DSP files.

PDFTODXF
The Graphics Toolkit utility that converts PDF files to DXF files.

PDM
Acronym: Parallel Discrete Monitor

PDO
Acronym: Parallel Discrete Output

PDS
Acronym: Process Data Server

PE
Acronym: processing element

PEMS
Acronym: Predictive Emissions Monitoring System

percent implied valve position (%IVP)
An attribute associated with the output of a primary control algorithm. This attribute indicates the calculated output value of the loop algorithm as 0 to 100 percent of span. 0 percent implies a closed valve, while 100 percent implies an open valve. The %IVP normally determines how much to open a valve actuator, which moves to a position.

percent of span
A scheme for indicating very large or very small values as simple percentages. The span is a range of values defined for a specific situation. The user establishes the limits of the range as low (0 percent) and high (100 percent) engineering-unit values. A percent-of-span value is a percentage of the difference between these limits.

periodic
A type of unsolicited data reporting: the sending device sends data at a fixed rate, whether or not that data has changed since the last transmission.

peripheral interface adapter (PIA)
An integrated circuit device that provides a number of parallel discrete input and output signals that can be controlled by the address and data signals of an MPU.

permission
An @aGlance/IT security feature that determines which PDS functions are valid for a specific user.

permissive
A condition that must be TRUE before a final control element can change. For example, starting a pump only if a tank level is greater than a certain amount.

personal computer (PC)
1. A computer equipped with all of the system, utility, and application software, and the input/output devices and other peripherals that an individual needs to perform one or more tasks.

2. A computer used to aid in the configuration of programmable logic controllers and distributed control systems, or for data acquisition and control.

PEU
Acronym: Process Engineering Units, or Percent to Engineering Units Conversion

PFR
Acronym: Power Fail Restart

PFST
Acronym: Pseudo Function Sequence Table

PFXPDF
The Graphics Toolkit utility that automates the conversion of PROFLEX® displays to PDF files.

phase
In batch control, several related elemental control steps grouped together for the purpose of batch tracking or operator intervention at the unit-operations-control level. A set of phases makes up a unit operation.

phase condition
A process condition that forces the operation of a batch to FAIL if the condition becomes TRUE during a specific phase of the operation.

phrase
In ASCII configuration source files, a keyword followed by one or more operands.

phrase list
In ASCII configuration source files, two or more phrases separated by commas.

physical layer
A layer of the HART protocol that specifies the device connections, such as signalling method, signal voltages, device impedances, and the media (Layer 1 of the Open Systems Interconnection [OSI] model).

See *Open Systems Interconnection (OSI)*.

physical location
The components in the tag number that indicate where a tag is to be found. Can mean actual physical places, such as plant 10 or Area 5, or other references, such as PID drawing references. Physical locations should specify the smallest unit of area for the location components of a tag.

PI
Acronym: Proportional/Integral Control Action or Process Instrumentation

PIA
Acronym: Parallel Interface Adapter or Peripheral Interface Adapter

PID
Acronym: Proportional/Integral/Derivative Control Action

P&ID
Acronym: Process and Instrument Diagram

PIF
Acronym: Program Information File in MS Windows

PIO
Acronym: Process Input/Output

PI_PID_I
Acronym: Proportional/Integral—Proportional/Integral/Derivative Control Action

PKT
Abbreviation: Packet

plant area
The collection of equipment in a plant that has common manufacturing strategies and alarm strategies.

plant location
The plant location is presented as the “location” within the database information portion of the Open Database dialog box in the IIS Client software.

plant management area (PMA)
A collection of plant process areas (PPAs). A PMA controls the console point reporting load, and indirectly, central processing unit (CPU) loading.

plant process area (PPA)
Within a process-control system, a collection of equipment that uses a common alarm strategy.

PLC
1. Acronym: Programmable Logic Controller

2. A registered trademark of the Allen-Bradley Company

plenum cable
Specially designed coaxial cable that is approved for use in plenums (air ducts) since the jacket material does not give off toxic fumes if burned.

plot display screen
A graphic presentation of historical data viewed on a graphic terminal.

PMA
Acronym: Plant Management Area

PMC
Acronym: Process Manager's Console

PMC(B)
Acronym: Process Manager's Console Batch

PMC(C)
Acronym: Process Manager's Console Custom

PMC(P)
Acronym: Process Manager's Console Preformatted

PMCS
Acronym: Process Manager's Computer System

point
1. A set of process-control parameters and data. The makeup and structure of each point depends on its role in collecting and reporting data and the type of device in which the point resides. Points are the most important logical units of a process control system; the number of points is one measure of a system's size and sophistication.

2. A software building block for a configuration in which resides the information from the process-control database, such as data and the action necessary to perform a particular control task.

pointer
Often referred to as an on-screen pointer, this graphical image appears on the workspace and represents the current location of the mouse or other pointing device.

pointing device
An input device such as a mouse or trackball used to move the pointer on the screen, choose commands, press buttons, select items or text, and so forth.

point set
A list of unit point tags that define a fixed path or portion of a path through a train. The unit point tags in a point set identify the hardware units that a recipe uses.

point-status summary
Contains data for all points in the console database, without regard to plant management area (PMA) mode, including process status for points with active smart error states. The point-status summary is displayed on the PROVUE® or Operator Workplace consoles.

point-to-point
A communication system in which only two devices are connected. The wiring goes from one point to the other point.

HART protocol operating in point-to-point mode can use an analog signal.

See *Multidrop*.

polling
1. A method of sequentially checking each channel to determine if it is ready to receive data or requesting computer action.

2. An address written to a smart field device by a HART universal command (Write Polling Address). The address is used to control the primary variable analog to output and provide a means of device identification.

population
The set of all possible values of a variable.

pop-up menu
A menu containing items relevant to a particular selection. A pop-up menu is displayed when activating certain mouse buttons or keyboard keys.

pop-up window
In Windows, a box that appears in the middle of the screen when clicking on a box or selecting a menu name, a *Help Contents* menu item, or a *Glossary* term.

port
A communications terminal of a highway device or tap. Each port is dedicated to the reporting of one device or one tap. Consequently, port numbers identify particular devices or taps.

power fail restart (PFR)
The actions of a device upon the loss and subsequent restoration of operating power.

power supply
The device within the DC6460-Series Console Electronics Unit that transforms external ac power to internal dc voltages.

See also *power supply unit*.

power supply common (PSC)
The negative terminal of the 24- volt system power supply: a reference for digital signals.

power supply unit (PSU)
In a PROVOX® system, a device or component that converts standard alternating current to the direct current voltage that other system devices need.

PPA
Acronym: Plant Process Area

PPA tracking ring
A configuration grouping of PPAs that maintains operational states and critical levels for all PPAs (as many as 501) in the system. Once a system operation begins, a console that accepts a change to a critical level or operational state automatically transmits the change to all other consoles in the ring.

P_PD
Acronym:
Proportional—Proportional/Derivative Control Action

PRC HIGH
Abbreviation: Process High Range

This remote detail display parameter (DDP) attribute, 102:PRC HIGH, shows the process high range as a floating point number. This attribute is a single-occurrence DDP, which accepts floating-point tuning data.

See *Calibration Block*.

PRC LOW
Abbreviation: Process Low Range

This remote detail display parameter (DDP) attribute, 103:PRC LOW, shows the process low range as a floating point number. This attribute is a single-occurrence DDP, which accepts floating-point tuning data.

See *Calibration Block*.

preamble
The first part of the HART protocol long frame data format. The preamble consists of three or more hexadecimal FF characters (all 1s) allowing the receiving modem time to get its frequency-detection circuits synchronized to the signal after a pause in transmission.

predictive emissions monitoring system (PEMS)
A system for predicting the key outputs of furnaces and other units that produce air pollution. PEMS systems normally use air flow rates, feed composition and flow rates, boiler temperature, humidity, and other inputs to predict NOx, SOx, particulates, and carbon monoxide.

preformatted console (PCON)
A formerly-manufactured PROVOX® console that has preformatted (already defined) displays for operator interface of 240 primary and 960 background points using overview, group, detail, and trend displays.

preprocess
The step in creating a neural net that checks, corrects, and filters the data values.

PRI
Abbreviation: Primary

primary control algorithm (PCA)
The principal control equation of a continuous control loop in a PROVOX® system. The PCA type and station (STA) type, defined during configuration, determine the main functionality of a point.

primary master
Masters are communicating devices. A primary master is a communicating device permanently wired into the instrument in the field. The primary master is the PROVOX® control system, which is responsible for originating and controlling all message transactions with the field device. In contrast, a hand-held communicator is a secondary master since it is not permanently wired into the instrument.

See *Secondary (SEC) Master*.

primary variable (PV)
The first of the HART-defined measured or derived dynamic variables accessible by HART commands from a smart field device. The primary variable (PV) usually contains the main information about the process being measured or calculated.

See *Dynamic Variables*, *Non-Primary Variables (NPV)*, and *Process Variable (PV)*.

printed circuit (PC)
A conduction path of metal on a substrate material which is used to carry signals between electronic components.

printed circuit board
An electrical circuit etched or deposited on a nonconducting substrate, complete with components necessary to perform a specific electronic function.

printed wiring board (PWB)
A board containing printed circuits (printed wiring) which serves as the mounting base for integrated circuits and other electronic components.

print head
The printer part that moves horizontally across the paper to perform the actual printing.

privilege
An operation that modifies the database is deemed a privilege, and must be assigned to a user.

procedure
1. A time-and-event sequence, with corresponding product data, used as part of a program for the manufacture of the product.

2. The sequence of statements that define a batch recipe.

procedure list
The ENVOX® database item that contains a list of the procedures that an activity point can run.

process
1. The highest level of action in a recipe. This level is composed of one or more operations that together perform a process-related function such as reacting or finishing.

2. A collection of physical devices and methods used in the production or manufacturing of a product.

3. A subdivision of a procedure defined for batch tracking or operator intervention at the batch cycle control level. A process in a procedure normally corresponds to a stage of a multi-stage production process.

4. The name of an interactive controller circuit card that accepts analog input signals, performs A/D and D/A conversions. and generates analog output signals.

process actions
See *Operation*.

process alarm level
See *Process Level* and *Process Status.*

process and instrument diagram (P&ID)
A symbolic representation of a process.

process average (X-Bar)
The location of the distribution of measured values of a particular process characteristic, typically designated as an overall average.

process capability
The level of product uniformity that a process is capable of producing. Process capability is expressed by the range or standard deviation of a specific product dimension.

process capability index
The engineering tolerance divided by the natural tolerance; that is, the specification range divided by six times the standard variation.

process control
Maintaining the optimum performance of a process.

process control language (PCL)
The control language in the CONTROL/21 system of Industrial Systems, Inc.'s (ISI's) CIM/21 product. This language is a script file that can execute instructions, such as are required for running a neural network.

Process Data Server (PDS)
A Fisher-Rosemount Systems' PROVOX® product implemented to communicate between Windows PCs and the Computer/Highway Interface Package (CHIP) software through Ethernet TCP/IP or DEC Pathworks. This package requires ACAS and @aGlance software. The corresponding product for the RS3 system product line is AX-S4.

process dynamics
Expected changes in the value of a variable due to the nature of the process. Sample data of a dynamic process appears to *drift* in a control chart.

process dynamics compensator (PDC)
A reduction used to remove process dynamics from real-time process variable data to detect sudden changes in the process variable.

process engineering unit (PEU)
Some smart field devices do not directly measure the quantity that the PROVOX® system needs to control. For example, a differential pressure transmitter sends data in *transmitter engineering units (TEU)*, which in this case is pressure. The PROVOX system then converts the pressure to *process engineering units (PEU)*, which might be gallons per minute (the measurement in the desired process units).

For direct inputs from smart field devices, the TEU and PEU are the same. For indirect inputs, the TEU and PEU are not necessarily the same. If indirect, the user must configure the ENVOX (P3.3) CALIBRATION BLOCKS form to define the relationship between TEU and PEU.

See *Calibration Block* and *Transmitter Engineering Units (TEU)*.

processing element (PE)
A node in a neural network which is analogous to a neuron in a biological nervous system. Processing elements (PEs) are connected together to form a network. Inputs to a PE are individually weighted and summed. The resultant value is processed with a transfer function which scales the input. The output may be used as an input by other PEs or as the result of the neural network.

process input/output (PIO)
The name of an interactive controller circuit card that accepts analog input signals, performs A/D and D/A conversions, and generates analog output signals.

process level
One of four default or configured labels (ERROR, WARNING, INFORMATION, or NONE) used to indicate the severity of a smart error state reported to the controller.

When a smart error state is reported, the process level is displayed as a status message on the console's standard point faceplates, and ENVOX® diagnostic displays show the process levels for the Smart Device Input Card or Output Card, and its specific channels.

See *Process Status* and *Smart Error State (SES)*.

process manager's console (PMC)
A PROVOX® device that allows an operator to monitor, adjust, and log parameters for many highway points at a single location. Optionally, a console can be used for configuration.

process manager's console batch (PMC(B))
An early name for the PROVOX® batch console (BCON).

process manager's console custom (PMC(C))
An early name for the PROVOX® custom console (CCON).

process manager's console preformatted (PMC(P))
An early name for the PROVOX® preformatted console (PCON).

process manager's computer system (PMCS)
An early name for the PROVOX® preformatted console (PCON).

process measurement
A measurement necessary to provide sensitive, reliable, economic, practical, and timely data for successful statistical process control.

process statement
The instruction level of a recipe. Examples would be: starting and running an operation, acquiring a unit, and so forth.

process status
Each of the 16 smart error states has an associated integrity status and process status. Process status is defined by a hierarchy of four process levels, one of which is communicated to the effected point in the controller to indicate the severity if a smart error state is reported.

process variable (PV)
In process control, a measurable quality or quantity whose change can cause other changes in the process, or make such changes possible. Common process variables are temperature, percent full, and rate of flow. The term *measured variable* is a synonym.

product data
A list of amounts, ingredients, loop setpoints, and so forth, that can be altered to produce variations in product or grade.

PROFLEX® software
A Fisher-Rosemount Systems' line of configuration software products for PROVOX systems. ASCII text files are the principal distinguishing feature of configuration through a PROFLEX device.

program information file (PIF)
A small file that determines how Windows runs a DOS executable program. PIF files can be edited from within Windows with the Windows program `PIFEDIT.EXE`.

programmable array logic (PAL)
A type of semiconductor device that can be used in place of many individual integrated logic gates. A user can program the PAL device with a complete logic pattern.

programmable controller (PC)
A control machine, built of computer subsystems, that takes the place of electro-mechanical relay panels. Programmable controllers make use of solid-state digital logic.

programmable controller interface unit (PCIU)
A PROVOX® highway device that permits programmable controllers to receive and respond to commands from other PROVOX devices such as consoles, trend units, and UOCs, using the data highway.

programmable logic controller (PLC)
A microprocessor or mini-computer system able to perform simple analog and discrete control. PLCs are typically used for motor control. The acronym PLC is trademarked by Allen-Bradley Company, Inc.

programmable read-only memory (PROM)
A computer chip that is programmable only by means of a special device; once programmed in this way, the chip becomes a ROM.

programmable serial interface (PSI)
The printed wiring board that fits into a Hewlett Packard computer, interfacing the computer and I/O peripherals that use serial data transmission.

PROM
Acronym: Programmable Read-Only Memory

prompt
A brief message, acronym, or symbol printed or displayed by a program or an operating system, asking the user to provide input.

proper string
In ASCII configuration source files, an alphanumeric character string enclosed in either single or double quotes.

proportional band (PB)
The change of input required to produce a full-range change in output, due to proportional control action. (The reciprocal of gain.)

proportional control action (P)
Control action in which the change in the output signal is directly proportional to a change in the error signal. Thus, there is a continuous linear relationship between output and input. The proportional multiplier is the ***gain***. (The error signal is the difference between the PV and SP values.)

proportional/derivative control action (PD)
Control action in which the output signal is proportional to the linear combination of the input and the time rate of change of the input signal.

proportional/integral control action (PI)
Control action in which the change in the output signal is proportional to a change in the error signal plus the time integral of the error. (The error is the difference between the PV and SP values.)

proportional/integral/derivative control action (PID)
Control action in which the change in the output signal is proportional to a change in the error signal, plus the time integral of the error, plus the rate of change of the input signal. (The error is the difference between the PV and SP values.)

proposed revision tag
A proposed revision tag represents a planned or projected change to an as-built tag.

protocol
1. A set of data formats and transmission rules for communication between electronic devices. Devices that conform to the same protocol can communicate accurately.

2. A set of rules that governs the way devices communicate with each other. Protocol might include specifications for transaction rules (master-slave relationship, acknowledgement, timeouts, error-recovery), message structure (start character, addressing, data formats, error checking), coding (text and numeric data formats), and physical signal characteristics (modulation techniques, signal type, signal level, and transmission medium, for example).

See *Highway Addressable Remote Transducer (HART)*.

PROVOX® process management products
The Fisher-Rosemount Systems' line of process control products used in PROVOX distributed process control systems.

PROVOX® common area (PCOMM)
A CHIP software subdirectory that contains general utilities, diagnostic utilities, and sample code.

PROVOX® Data Highway
An Fisher-Rosemount Systems' network system that communicates at 250 kilobaud using a local traffic director to coordinate and prioritize device messages. The communications protocol used is adapted from the CCITT x.25 standard.

PROVOX® display format (PDF)
ASCII-based format used for operator screen displays on PROVOX system consoles.

PROVOX® Highway II
A Fisher-Rosemount Systems network system that communicates at 5 megabaud for complex process control systems by using a token-passing bus access method. This system is the FRSI implementation of ANSI/IEEE 802.4 token bus access.

PROVUE® console
The Fisher-Rosemount Systems' line of console products for PROVOX systems that use a global database configuration and have high-resolution graphics, ergonomically designed keyboards, and color printers.

PROVUE® console point type
See *Object ID*.

PROVUE® display format (PDF)
The ASCII tab-delimited intermediate file format for PROVUE displays.

proxy
An @aGlance/IT security feature that allows a client on an external node to access a server on the local node.

PSC
Acronym: Power Supply Common

pseudo function sequence table (PFST)
The established set of function blocks within a configurable controller or a UOC. Each of these function blocks, within the fixed sequence, can be enabled or disabled, to yield a variety of control effects.

PSI
Acronym: Programmable Serial Interface

PSU
Acronym: Power Supply Unit

PS/2
The name for a line of small IBM computers. PS/2 is a mark of IBM.

PT
Abbreviation: Point

PTM
Acronym: Pulse Time Multiplex

pull-down menu
A menu accessed from one of the menu bar selections.

pull-right menu
A submenu accessed from one of the many pull-down and pop-up menu selections.

pulse count input (PCI)
A PROVOX® point type. A PCI point either reads a series of electronic pulses or switch closures or receives a 16-bit unsigned integer in the range 0-65535. (Many sensors or other field devices transmit information as a series of pulses or contact closures.) An alternate name for PCI point is integer point.

push button
A graphic component which simulates a pushbutton. A graphic push button is activated using the on-screen pointer, mouse button, or keyboard.

PV
Acronym: Process Variable or Primary Variable (HART term).

PVE
Acronym: PROVUE® Electronics

PWB
Acronym: Printed Wiring Board

PWR
Abbreviation: Power

Q & A
Acronym: Question and Answer

Q-bus
Acronym and term describing a 22-bit backplane bus developed by Digital Equipment Corporation that has become an industry standard. The 16-bit data lines and 22-bit address lines are multiplexed.

QLD
Acronym: Question List Display

questionable value
In the PROVOX® Data Historian (DH) product, a questionable value is one where a value is read, but due to limits, integrity, or other flags, this value may not be valid and therefore should not be trusted.

question list display (QLD)
A display of configuration parameters, with blank fields for values (or default values). To configure a PROVOX® system or product that uses QLDs, a user fills in the blank fields of the applicable QLDs.

radio button
A graphic component representing a mutually exclusive set of selections. Radio Buttons are typically used for setting states or modes. Radio Buttons are represented by a diamond (♦).

Radio, Electronic, and Television Manufacturers' Association (RETMA)
Formerly, a group of electronic manufacturers who developed a standard for rack mounting of electronic equipment. Replaced by EIA.

radio frequency interference (RFI)
Inadvertently transmitted energy that falls in the frequency band of radio signals. If this energy is sufficiently strong, it can influence the operation of electronic equipment.

RAM
Acronym: Random-Access Memory

random-access memory (RAM)
A type of semiconductor memory. A user can read from and write to a RAM as often as desired.

randomness
A condition in which individual values are not predictable although they come from a definable process.

random sample
A sample in which each member of the population has an equal chance of being chosen.

range
The difference between the highest and lowest values of a subgroup. The expected range increases with sample size and standard deviation.

RAT
Abbreviation: Ratio

rate
See *Derivative (Rate) Control Action (D)*.

ratio
A proportion that a controller maintains between the values of two variables, as part of a control strategy. The ratio is usually defined as a tunable value during configuration of the controller so that it may be adjusted on-line.

raw partition
A designated area of a disk for databases and transaction logs which is accessed directly by the operating system and does not use the native file system. Raw partitions are used on UNIX-based systems that do not support logical devices.

RBGW
Acronym: Red, Blue, Green, White

RBL
Acronym: Rosemount Basic Language

R chart
A control chart of the range variation among individual elements of a sample; that is, the difference between the largest and smallest elements.

RCIA II
Acronym: Redundant Communication Interface Assembly II

RCM
Abbreviation and IBM mark: Realtime Computer Microcode

RCV
Abbreviation: Receive

RDBI
Acronym: Relative Database Index

RDBMS
Acronym: Relational Database Management System

read-only memory (ROM)
A memory in which information is stored permanently. A user can examine ROM contents as often as desired but cannot change the contents.

readout
A display that shows the value of a G2 variable, parameter, or expression.

See *Variable* and *Parameter (PARAM)*.

read/write memory (RWM)
Another name for random access memory (RAM).

real
A PROVOX® point type. A real point has a single real (floating-point) value referenced by the setpoint.

real tag
A real tag is an as-built tag even if it is archived or decommissioned.

realtime computer microcode (RCM)
Operating system software for an IBM RIC card. The acronym RCM is an IBM mark.

real time executive (RTE)
The operating system of Hewlett Packard's HP1000 series computers.

realtime interface coprocessor (RIC)
Circuitry for external communications for an IBM computer; an RIC card fits into an expansion slot of the computer. The acronym RIC is an IBM mark.

real-time single-board computer (rtSBC)
A VME-bus module containing the DC6460-Series Console Electronics Unit's CPU and either 4 mb or 16 mb of RAM.

Also see *CPU*.

real-time trace
A trace whose End Time is later than the sample in the source historical data file. Such traces are automatically updated as other samples become available in the historical data file. If space is unavailable at the right of the screen to draw the gathered real-time trace sample, the display is redrawn shifting the window so that the left 75-percent of the screen contains the most recent samples and the right 25-percent contains real-time updates. When a trend display is first recalled, or when another trace is added, both begin automatically as real-time traces.

reboot
To restart the computer and load the operating system.

REC AO
Acronym: Data Record Analog Output

recipe
A set of grade parameters and process statements that communicate to a batch control system how to process raw materials to make a particular product. A recipe has four main components: the header, the formula (or grade parameters), the procedure (or sequence), and the equipment list.

recipe author
The person or persons who create the recipe.

recipe header
The Recipe Manager software facility that contains the recipe name, author, version, date of creation, date last modified, description, and comments about the recipe.

recipe management
A structured method used to develop, store, retrieve, and maintain batch control recipes.

recipe procedure
See *Procedure*.

recipe statement
The smallest part of a recipe procedure. A line of text within a recipe, created with the recipe editor, which is a command or action to be performed as part of the process sequence.

RED
Abbreviation: Redundant

reduce
To minimize a window to an icon by using the **Minimize** button or the **Window** -> **Minimize** menu command.

redundant
System held in reserve or backup to the primary system.

redundant information
A means of detecting, and in some cases correcting, errors introduced in sending data.

HART protocol includes redundant information in the form of an odd parity bit for each byte, a checksum character for each message, and the echoing of address, command, and data fields from the host in the reply from a slave device.

reference
A PROVOX® point type. A reference point is used to retain a single analog or discrete value. Analog reference values are typically displayed on a console display as a PV bar graph and used as outputs to field devices. In a reference point, the device containing the point is only allowed to read the value and other system devices are allowed to read or write the value.

reference/deviation
A PROVOX® point type. A reference/deviation point compares the two analog values: process variable (deviation value) and setpoint (reference value). If the difference between these values does not conform to the control strategy, the point changes the setpoint value to correct the difference.

reference register
A type of register, for use in a function sequence table (FST) or a calculation. An operator sets the value of such a register as part of its creation. A system device reads a value in a reference register, and uses the value in its mathematical or logical operations. The device cannot change the value in a reference register or use the register for storage of another value.

refresh
A screen is refreshed when data is reread from the server.

register
A memory location for temporary storage of a value.

relational database system
A DBMS is the actual software which controls the database. The RDBMS does the filing, retrieval, indexing, allocation of disk space for data, and so on, needed to handle data being stored, modified, or retrieved.

relational paradigm
Set information represented in two-dimensional tables.

relative database index
An integer that represents a storage location within an area of a database. For example, all DCD points are stored in one area of a PROVOX® database. The relative index of a particular DCD point is the offset from the database index of the first DCD point in the database.

relative time
The length of time which is added to or subtracted from an absolute time. Relative time is entered using the + DD HH:MM:SS or the – DD HH:MM:SS format, where DD represents the number of days and HH:MM:SS represents standard time code entries. Relative time is distinguishable from absolute time by the use of + or – as its first character.

relative training error limit
This parameter in the Options Customize dialog box communicates to the *Design Number of Hidden Neurons* and *Train* operations to stop when the relative error (after scaling all of the variables) is less than this value. This value is the root mean squared (RMS) error of the actual minus predicted value of all of the outputs.

REM O/S
Acronym: Remote Out of Service

This remote detail display parameter (DDP) attribute, 133:REM O/S, shows FIELDVUE variable 11, instrument out of service, as a yes (out of service) or no (in service). This attribute is a single-occurrence DDP, which is tunable.

remote point
A point that receives its parameter values from a local point in *another PROVOX® device*. With CHIP software, the parameter values of CHIP remote points are received from other PROVOX devices using the CHIP software's unsolicited receive functionality.

remote setpoint mode (RSP)
A loop control mode: the controller algorithm changes the control output to minimize the difference between values of the setpoint and the process variable. The setpoint value comes from outside of the control loop; typically from the output of another control loop.

replot
The **Replot** tool redraws both the spreadsheet and the chart of the currently active display window. This tool might be desirable when the size of a window or pane has changed.

REQ/RESP
Acronym: Request/Response

request/response (REQ/RESP)
A one-time data reporting method: the receiving device requests data, and the responding device sends it. Request/response reporting contrasts with unsolicited reporting, which happens without a request, according to a schedule.

request/response link
A PROVOX® communications channel that supports request/response communications to other devices on the data highway. Request/response links are assigned to communication channels 2 through 4 on the Type DH6021 NIU or Type 6032 HDL.

reserved words
Reserved words are used by Interactive Structured Query Language (ISQL) as keywords (command verbs) and cannot be used for the names of databases, tables, rules, defaults, and so forth. Reserved words are used for the names of local variables and for stored procedure parameters.

reset
1. To return the MPU and ~~any~~ associated circuits to their starting states.

2. The name given to a button a user pushes for such a reset, or to a signal directing such a reset.

3. Another name for integral control action.

resistance temperature detector (RTD)
A device or element that measures process temperature very accurately. RTDs sense temperature changes by measuring the resistance of a coiled metal wire, typically platinum.

re-size
To change the height or width of a window.

re-size border
The MWM window frame that surrounds the Window used to change the height and width of the window.

resource
A unit or other piece of plant equipment used to produce a batch.

response window
The time during which a highway device is added to a logical token ring.

restart
To re-power a device of a PROVOX® system.

restore
In Windows applications, to return a window to its previous size by clicking on the small box containing both an up and down arrow at the right of the title bar, or by selecting the **Window** -> **Restore** menu command.

RETMA
Acronym: Radio, Electronic, and Television Manufacturers' Association

retranslation
The process of determining a numerical value for the output of a fuzzy logic controller from the resulting set of output membership functions. This process is sometimes called *defuzzification*.

See also *defuzzification*.

return loss
The relative difference between the level of a signal on a cable and the signal reflected back from an impedance mismatch.

reverse acting
Said of a control action in which the absolute value of the output signal decreases as the absolute value of the input signal (process variable) increases.

revision number
Identifies the most current revision of a tag number, and identifies the history of changes for a tag.

RFI
Acronym: Radio Frequency Interference

RGB
Acronym: Red, Green, Blue

RGBW
Acronym: Red, Green, Blue, White

RIC
Acronym and IBM mark: Realtime Interface Coprocessor

RMP
Abbreviation: Ramp

RMV9000
The Fisher-Rosemount Systems RS3 product line of advanced process control equipment composed of distributed microprocessor-based control and data acquisition devices that communicate with operator consoles over a PeerWay.

ROM
Acronym: Read-Only Memory

root mean squared (RMS)
The RMS error is computed by squaring the error of each value, adding them together, taking the square root, and dividing by the number of samples. The error is usually the difference between the actual and predicted values.

Rosemount Basic Language (RBL)
A Rosemount-proprietary programming language for writing batch programs. RBL uses modular features and sequential instructions that are similar to their counterparts in the BASIC language. The equivalent for a PROVOX® system is function sequence table (FST) code.

router
A device that filters network traffic based on the IP address.

routine
A command or call within a CHIP program that passes parameters and receives data through its parameter list.

RSP
Acronym: Remote Setpoint Mode

RST
Abbreviation: Restart

RST MD
Acronym: Restart Mode

This FIELDVUE shadow AO point detail display parameter (DDP) attribute, 28:RST MD, allows FIELDVUE variable 201, *restart control mode*, for a loop to be displayed or changed on a PROVUE® or Operator Workplace console. The restart mode can be a mode as defined by the station type selected for the point. This DDP has range checks 1 through 6.

See *FIELDVUE Shadow AO Point*.

RS-232C
A standard specified by the Electronic Industries Association (EIA) for serial asynchronous communications, originally designed for the connection of *data terminal equipment* (DTE) and *data communications equipment* (DCE) over distances less than 50 feet. This standard defines connectors, signal meanings, and signal voltage levels. In most applications, many of the handshaking and other controls of the standard are not used, leading to a large number of minor variants.

An EIA standard for transmitting data serially through a cable 50 feet or less in length.

For all practical purposes, the CCITT V.24 standard is the same as RS-232-C.

RS3 process control products
A Fisher-Rosemount Systems product line of advanced process control equipment for distributed microprocessor-based control and data acquisition devices that communicate with operator consoles over a data highway called a PeerWay.

RTD
Acronym: Resistance Temperature Detector

RTE
Acronym: Real Time Executive

rtSBC
Acronym: Real-time Single-board Computer

rtVAX 300
The Digital Equipment Corporation computer contained within the DC6460-Series Console Electronics Unit.

rule inference
In fuzzy logic control, the process of evaluating if-then rules based on fuzzy variables to determine the logical sum of the individual rules.

rule table
In fuzzy logic control, a matrix of output membership function labels (control actions) based on input membership function labels (conditions).

run
A consecutive number of points consistently increasing or decreasing, or above or below the central line.

run chart
A graphic representation of a process characteristic.

See *Control Chart.*

RWM
Acronym: Read/Write Memory

SA
Acronym: System Administrator

SAM
Acronym: System Administrator Manager

SAMA
Acronym: Scientific Apparatus Makers Association

sample
There are two kinds of samples: Input and output. A sample is defined in the Intelligent Sensor Toolkit as a set of data taken at the same time. Often, the data in one sample is not sufficient to predict an output due to time delays involved. The concept corresponding to sample after the time delays are accounted for is called an *observation*. Samples are not good, outlier, or missing; rather, the individual *values* in a sample are good, outlier, or missing.

sample clock
In an RS3 implementation, the sample clock determines when the collecting and filtering of data for the RS3 intelligent sensor occurs. Sample clock values are entered in the NetOut ControlBlock.

sample file
There are two kinds of sample file extensions of `.in` and `.out` respectively. In the Intelligent Sensor Toolkit, every neural net has exactly one `.in` file and one `.out` file.

sample multiplier
In an RS3 implementation, a sample multiplier affects the ticking rate of the network execution clock, based on multiple ticks of the sample clock. A sample rate multiplier of five ensures that the sample clock ticks five times as fast as the network execution clock.

sample size
The number of elements, or units, in a sample.

sample (statistics)
A representative group selected from a population used to estimate the properties of the population.

sample variation
The variation of an individual sample's properties from those properties exhibited by the population from which it was drawn.

sampling
The selecting of population samples in such a way that the individual sample is representative of the population.

SC
Acronym: Signal Common

scale
The ability to re-size a graphic image.

scan
Sequential interrogation of devices or points.

scan rate multiplier
An integer that is used to multiply the *input sample* rate to arrive at the intelligent sensor's *network execution rate*.

scatter
The variability or dispersion in a data series. Range, mean absolute deviation, variance and standard deviation are measures of scatter.

SCL
Acronym: Session Command Language

SCL session
The interaction between a user and the console computer. Use an SCL session and SCL commands to maintain the console computer nodes and user databases and perform other tasks.

Scientific Apparatus Makers Association (SAMA)
A trade association that develops standards for symbology, terminology, and procedures within the chemical and process control industries.

screen menu
The menu of AutoCAD commands that appears to the right of the drawing area.

scroll
In Windows, to move (up, down, left, or right) through text, a list, or graphics to see parts of the file, list, or screen that cannot fit into the window.

scroll bar
1. A graphical device used to move information in a window. Scroll bars are available when there is more information than can fit in the window.

2. In Windows, a bar that appears at the right edge or bottom of a window whose contents are not entirely visible. Typical scroll bars each have a scroll box and two scroll arrows that can be used to control what is shown in the window.

SCSI
Acronym: Small Computer System Interface

SDF
Acronym: Statistical Data File

SDLC
Acronym: Synchronous Data Link Communication

SEC
Abbreviation: Secondary

secondary (SEC) master
The HART protocol allows for two masters in a system. The secondary master is usually a hand-held communicator or a maintenance computer.

See *Primary (PRI) Master*.

secondary variable (SV)
The second of the HART-defined measured or derived dynamic variables accessible by HART commands from a smart field device is the secondary variable. In most cases, the secondary variable (SV) contains information associated with the process being measured and reported in the *primary variable (PV)*.

See *Primary (PRI) Variable*.

second prefix
An optional, more specific location identifier.

security
1. In databases, the software feature for controlling access to insert, update or delete information.

2. In IIS software, access control beyond that provided by SQL Server.

SEL
Abbreviation: Select or Selector

select
To choose an item, a group of items, a piece of text, or a menu option. Most things can be selected by pointing the mouse cursor at the item, text, or option, and then clicking.

selection
The object or action that is selected from either the menu bar, pulldown or popup menus.

self test
Circuitry used by devices such as the Smart Device Input Card and Output Card to automatically verify the proper operation of their components and subsystems.

sensitivity
Sensitivities are produced by partial least squares (PLS) in the Design Inputs and Delays operation. A sensitivity is a measure of the importance of an input plus time delay in predicting an output. Sensitivities vary from 0.0 to 1.0, with 0.0 meaning no correlation at all. Sensitivities always add as many as 1.0.

sensitivity analysis
In fuzzy logic control, the function in the *Design Inputs and Delays* operation that determines the relative movement of inputs versus outputs and other inputs. Sensitivity analysis is used to determine which of all of the possible inputs should actually be inputs for training the neural net.

sensor
1. A G2 object that contains one piece of data, usually supplied by an external source like ESDS. (See *Object*.)

2. A device that produces a voltage or current output representative of some physical property being measured (for example, pressure, temperature, or flow). Generally, the output of a sensor requires further processing before it can be used by the control system.

sentence
In ASCII configuration source files, the smallest complete unit of configuration information, also known as a definition sentence. Each sentence consists of a master keyword, one or more phrases separated by commas, and a period.

sequence control
The ENSTRUCT software function that executes a series of functions in the order specified. For example, a sequence might be used to start a series of conveyors.

serial
A procedure for transferring digital information from one device to another as a time-sequential bit stream, one bit after another on a single transmission path.

Usually the transmission path is a wire or a pair of wires, but other media can be used. There also may be an additional path carrying a clock signal.

HART protocol uses serial transmission. Since the HART protocol is asynchronous, there is no extra clock signal.

serial batch structure
A number of sequential processes. The simplest batch structure.

serial interface
A data transmission device through which bits are sent sequentially.

serial interface unit
A device that lets a computer communicate with other devices of a PROVOX® instrumentation system, using the data highway.

serialization of access
When two users attempt to perform the same operation, or an operation where the action of the first user will impact the other, the server forces the operations to occur in sequence (serially), rather than in parallel.

serial loop numbering
Does not allow loop numbering to be repeated in a particular location for an instrument group.

server
A computer which acts as a hub. Other PCs extract from or upload data to this computer. Commonly, a DBMS runs on the server, which stores/retrieves data into a database on the server. Data is sent from other PCs to the server to be stored or retrieved. Data is also sent from the server to requesting PCs. PCs interacting with the server are called clients.

server name
The name of the server as it appears in the Login box.

service transfer unit (SVXFR)
A stand-alone maintenance product which maintains the current output to a final control element during the replacement of regulatory controller cards.

servo
Abbreviation: Servomotor

1. A device that contains and delivers power to move a control, such as a valve stem.

2. An automatic feedback control device in which the controlled variable is a mechanical position or one ~~any~~ of its time derivations.

SES
Abbreviation: Smart Error State

session
The period of time when an individual user is performing process control functions.

Session Command Language (SCL)
The interface to the console computer operating system.

set
An action that allows G2 to alter the value of an external variable or to set another value for the simulated value of a variable.

setpoint (SP)
An input variable that contains the desired value for a process variable. Control loop algorithms compare the process variable with the setpoint, to determine an output.

settling time
The time required, following a process disturbance or setpoint change, for a controller's output value to return to a steady state condition.

SFDC
Abbreviation: Standard Format Operator's Console

SGP
Acronym: Shield Ground Point

shadow point
See *FIELDVUE Shadow AO Point.*

shape
The pattern formed by a distribution of values.

shell subroutine
A subroutine the ENSTRUCT software uses to access and manipulate database resident information.

shield ground point (SGP)
A copper bus bar that fits in horizontal cable trays in a system cabinet. This bar is a convenient place to ground signal cable shields.

shielding
Surrounding an electrical circuit or signal-transmission cable with a ground plane, such as a foil or woven-metal sheath (the shield) to minimize the effect of adjacent electrical circuits.

short frame
The HART protocol specifies a message structure in two formats, one short and the other long. Some smart field devices use the long frame format, while other devices may use the short frame format.

Through HART revision 4, in the short frame format, the address of the slave device is either 0 for non-multidropped devices using the 4-20 mA current signal, or 1-15 for multidropped devices.

See *Long Frame*, *Master-Slave*, and *Multidrop*.

shutdown control
The ENSTRUCT software function that monitors as many as 16 conditions and causes a shutdown if one or more of the conditions becomes TRUE. The shutdown control function is provided in the continuous control shell mask file SD-XXXXX.MSK.

SIA
Acronym: Serial Interface Assembly

SIG tools
Three tools on the toolbar allow the user to rapidly move the splitter bar. The left-most tool (**IG**) moves the splitter bar such that the spreadsheet pane is 10% of the window area and the graph is 90% of the window area. The middle tool (**SIG**) centers the splitter bar. The right-most tool (**SI**) moves the splitter bar all of the way to the right.

sigma (σ)
The Greek letter designating a standard deviation.

sigma quality
A statistical measure expressing how close a product comes to its quality goal. One sigma means 68% of products are acceptable; three sigma means 99.7% (definition from Business Week/Quality 1991). One sigma is the range bounded by the mean value plus or minus one standard deviation; two sigma is the range bounded by the mean value plus or minus two standard deviations, and so forth.

sigmoid function
A function with the characteristic of generating an S-shaped curve, where the output is nearly constant at a low level for inputs below a certain value, and the output is nearly constant at a high level for inputs above a certain large value. The Intelligent Sensor Toolkit uses a centered sigmoid function:

$$y = (1-e^{-x}) / (1+e^{-x})$$

signal common (SC)
A ground point that provides a reference for analog input and analog output signals in a PROVOX® system. System installers should reference all other DC wiring to power supply common (PSC).

signal value analog (SVA)
The analog floating-point portion of the accumulator register in the FST of a controller.

signal value discrete (SVD)
The discrete portion of the accumulator register in the FST of a controller.

signal value percent (SVP)
The analog percentage portion of the accumulator register in the FST of a controller.

SIMO
Acronym: Single-Input, Multi-Output

simple operand
In ASCII configuration source files, a keyword, a proper string, an integer, or a real number.

simplex
1. A method of data transfer in which data is transmitted in one direction only (send or receive).

2. A stand alone system without backup.

See *Full Duplex Communication, Half Duplex,* and *Redundant*.

SIMVOX
The SIMVOX Real-time Process Simulation Software includes software tools and sub-routine libraries and user-written models to observe and analyze process configurations. SIMVOX also allows review and manual change of input/output I/O to the control strategies and operator displays without the model programs.

SIMVOX is a mark of Don H. Munger Co.

sine wave
A waveform of a pure alternating current or voltage that is often viewed on an oscilloscope. This waveform is drawn on a graph of amplitude versus time or radial degrees.

See *Bell 202* and *Protocol.*

single-input, multi-output (SIMO)
A controller or process with a single controlled input variable and more than one manipulated output variable. A couple of examples of these are split range controllers and header pressure masters manipulating multiple sources.

single-input, single-output (SISO)
A controller or process with a single manipulated variable and a single controlled variable. Most PID controllers have, until recently, only controlled a single variable like flow, temperature, level, pressure, and so on.

singleton
In fuzzy logic control, a type of output membership function having a single numerical value regardless of the degree of membership.

SISO
Acronym: Single-Input, Single-Output

site recipe
A recipe that refines a general recipe by including site-specific information, but not detailed equipment information.

SIU
Acronym: Serial Interface Unit

skewed data
Data that is correct, but improperly emphasizes one aspect of the entire training region. For example, a neural net that is trained only on operating data that is normal cannot be guaranteed to perform well during process upsets when the data is in regions where the neural net has not been trained.

skip factor
The optional setting permitting the *skipping over* of data samples gathered from historical data files. A skip factor of one retrieves and displays consecutive data supplies, while a two retrieves and displays every other data sample, a three retrieves every third data sample, and so on.

The skip factor may be used to increase the viewable time span for a trace, to limit the number of samples displayed, or both, thereby decreasing trend display drawing time.

slide library
The collection of slides that store the drawing symbols that are a part of the Graphics Toolkit software. Slides can be picked from the pull-down menus within the AutoCAD display editor.

See *Icon Menu*.

slot
A position in the DC6460-Series Console Electronics Unit where a card or assembly can be installed in the backplane.

slot time delay
The length of time required for a device to send a message to another device on a highway and receive an answer back.

small computer system interface (SCSI)
An interface standard for connecting peripheral devices, such as hard disk drives containing control circuitry, to computer systems.

smart alarm control
The ENSTRUCT software function that monitors as many as 16 conditions and causes an alarm if one or more of the conditions becomes TRUE. The smart alarm control function is provided in the continuous control shell mask file AL-XXXXX.MSK.

smart channel modes
Each channel of the Smart Device Input Card or Output Card can be configured to operate in one of three modes: *analog*, *hybrid*, or *digital.*

See *Analog*, *Digital*, and *Hybrid*.

smart discrete control device
A smart DCD is used in conjunction with an element control function. This device interfaces through field I/O to discrete field elements such as motors, valves, and pumps.

smart error state (SES)
Status information about Smart Device Input or Output cards, in addition to the device status byte from a smart field device. As many as 16 SESs are reported, slightly different for the Smart Device Input Card and Smart Device Output Card, and for analog, hybrid, or digital signals. The SESs have *integrity error levels* and *process alarm levels*.

smart field device
A smart field transmitter, transducer, or valve controller that uses HART communications protocol.

smart transmitter interface (STI)
A Type CL6822 Smart Transmitter Interface Card provides an input interface to some smart field devices.

smart variable enable mask
A field on the ENVOX® (P3.3) SMART IO CHANNELS configuration form that allows the user to define which variables to receive from the smart field device. The user sets flags depending upon the variable numbers to be enabled. Variable one is the primary variable (PV) and is always enabled for each channel type. Variables 2 through 16 may be selected as needed. Their definition and usage must be obtained from the smart field device manufacturer.

SMIN
Abbreviation: Smart Input

An FST instruction that reads the values of the primary variable (PV) or a non-primary variable (NVP) of a Smart Device Input Card channel into either floating-point integer signal values or discrete signal values.

SMOUT
Abbreviation: Smart Output

An FST instruction that sends an output value to the primary variable (PV) or a non-primary variable (NVP) of a Smart Device Output Card channel. The value is converted, if necessary, to the format required by the type of smart field device.

SMT HIGH
Acronym: Smart Variable High Range

This remote detail display parameter (DDP) attribute, 222:SMT HIGH, is used to change the upper range value of a smart field device from a console.

This tunable DDP has 16 occurrences. Occurrence 1 returns the upper range value (20 mA end point) for the primary variable (PV). Occurrences 2 through 16 return the sensor high limit for the corresponding non-primary variables (NVP).

See *Calibration Block*, *Non-Primary Variable (NVP)*, and *Primary Variable (PV)*.

SMT LOW
Acronym: Smart Variable Low Range

This remote detail display parameter (DDP) attribute, 223:SMT LOW, is used to change the low range value of a smart field device from a console.

This tunable DDP has 16 occurrences, Occurrence 1 returns the low range value (4 mA end point) for the primary variable (PV). Occurrences 2 through 16 return the sensor low limit for the corresponding non-primary variables (NVP).

See *Calibration Block*, *Non-Primary Variable (NVP)*, and *Primary Variable (PV)*.

SMT UNIT
Acronym: Smart Variable Units

This remote detail display parameter (DDP) attribute, 221:SMT UNIT, shows the units of measure that are configured for the selected variable of a smart field device. The console generally interprets this value and displays the units of measure as a text string.

When accessing this DDP from FSTs or CHIP, subtract 30002 from the value returned to determine the HART unit code.

This read-only DDP has 16 occurrences. Occurrence 1 shows the units of measure for the primary variable (PV). Occurrences 2 through 16 show the units of measure for the corresponding non-primary variables (NVP).

See *Calibration Block*, *Non-Primary Variable (NVP)*. and *Primary Variable (PV)*.

SMT VAL
Acronym: Smart Variable Values

This remote detail display parameter (DDP) attribute, 220:SMT VAL, shows the current value of the selected variable in engineering units.

This read-only DDP has 16 occurrences. Occurrence 1 shows the current value being read for the primary variable (PV). Occurrences 2 through 16 show the current value for the corresponding non-primary variables (NVP).

See *Calibration Block*, *Non-Primary Variable (NVP)*, and *Primary Variable (PV)*.

.sn$_{[x]}$ file
Temporary file to store a sensitivity script file (`nndesinp.sen`) in the *Design Inputs and Delays* operation.

softkey
1. A keyboard key that activates one of several functions, according to the portion of software executing at the moment. Commonly, a screen display indicates the current functions of all softkeys.

2. Another name for multifunction key.

software (SW)
Microprocessor or computer programs and routines that reside in alterable memory (usually RAM or magnetic media), as opposed to firmware, which consists of programs and routines that are programmed into an integrated circuit.

source file
An ASCII-text configuration file that contains definitions of one or more system hardware devices or logical units.

SP
Acronym: Setpoint

span
See *Percent of Span*.

SPC
Acronym: Statistical Process Control

special cause
A source of variation from outside the system. This cause is intermittent, unpredictable, unstable, and indicated by a point outside the chart's control limits. Special cause may also be indicated by a non-random pattern of points inside the chart's control limits.

specification
The engineering requirement stating the product's characteristics of acceptability.

split-range controller
A controller with multiple outputs. A few examples of split-range controllers are: loops that manipulate both heating and cooling elements which control the same temperature value and controls that require two valves (typically a large one and a small one) to achieve the required rangeability.

splitter bar
In general, a splitter bar on a screen separates two or more panes within one view. In the Intelligent Sensor Toolkit, every window has one vertical splitter bar. The user can drag the splitter bar with the mouse or trackball to see more of the spreadsheet at the expense of the graph, or vice versa. The user can also quickly change the splitter bar to the center, left, or right by selecting one of the three **SIG** tools on the toolbar.

SPLX
Abbreviation: Simplex

spread
The extent by which values in a distribution differ from one another. Spread is also called dispersion.

spreadsheet
1. A means of representing data in rows and columns.

2. A commercial software package, such as Quattro Pro, Lotus, or Excel, that has a spreadsheet, limited database, and charting function.

3. A portion of the Intelligent Sensor Toolkit chart that appears in the left pane of each display window.

SP72 attribute
A component of the ISA SP72 data model. In the model, data is organized into blocks. Each block in a control system is identified by a unique name or tag and each item within a block is identified by an attribute.

SQC
Acronym: Statistical Quality Control

SQL
Abbreviation: Structured Query Language.

SQRT
Abbreviation: Square Root

SQX
Acronym: Statistical Quality Control

SR90
Abbreviation: 20-series (SR90) Controller Family

The PROVOX® SR90 controllers, depending upon the type (MUX, EMX, IFC, UOC), range from simple discrete to advanced continuous and advanced batch control devices.

See *Controller*, *Expanded Multiplexer (EMX)*, *Integrated Function Controller (IFC)*, *Multiplexer (MUX)*, and *Unit Operations Controller (UOC)*.

SRx
The PROVOX® SRx controllers are advanced, ruggedized, multi-functional control devices.

The SRx controller provides most of the same features as SR90 controllers, except that it supports 1:1 redundancy. This controller provides increased performance and configuration memory, and supports the backup control unit (FCU) application module that allows a standby unit to backup a primary unit regardless of size.

SSDA
Acronym: Synchronous Serial Data Adapter

ST
Abbreviation: Station

STA
Abbreviation: Station

stability
The statistical control of a process resulting from a lack of special cause variation.

stable process
A process in statistical control.

standalone
Said of a self-contained system that exists and performs as an autonomous unit.

standard ac^2
A multiplexer point type that monitors signals associated with *ac^2* 100 instrumentation.

See *ac^2*.

standard analog input
A multiplexer point type that accepts an analog signal from a field device, then passes the value directly to the data highway.

standard analog output
A multiplexer point type that receives an analog value from the data-highway, then converts that value to an analog signal which is sent to a field device.

standard deviation
A measure of the spread, or dispersion, of process output. This measure is defined by

standard deviation = square root of variance

standard discrete output
A multiplexer point type that receives a discrete value from the data-highway, then converts that value to a discrete signal which is sent to a field device.

standard format operator's console
An early name for the PROVOX® preformatted console (PCON).

standby controller
Part of a redundant set of controllers currently monitoring the active unit but not manipulating the outputs.

start and stop bits
In asynchronous communication, the first and last bits are used to indicate the start and end of a character, The start bit is a 0, following an idle period of 1-level signal. The stop bit is 1, ensuring that the next start bit is recognizable even if there is no idle bit period.

STAT
Abbreviation: Station, or Status

state
See *Operating State* and *Smart Error State*.

statement
See *Recipe Statement*.

station (ST, STA, or STAT)
Definition of the valid control modes for a control loop. Possible modes include manual (MAN), automatic (AUTO), remote setpoint (RSP), supervisory (SUP),direct digital control (DDC) and computer (COM).

statistical control
The condition of a process from which all special causes of variation have been eliminated and only common causes remain. This condition is indicated by a control chart with all points within the chart's control limits and the absence of non-random patterns or trends.

statistical data file
A data historian file used for statistical data storage.

statistical process control (SPC)
The use of statistical methods to analyze a process and its outputs to take action to achieve and maintain a state of process stability or statistical control.

statistical quality control (SQC)
The process of maintaining an acceptable level of product quality through statistical methods.

statistics data file (SDF)
An internal file format of the FIsher-Rosemount Systems' PROVOX® Data Historian (DH) product. Other products, such as the Intelligent Sensor Toolkit software, use information taken from this file to generate reports.

status (STAT)
See *Alert*, *Device Status Byte*, *DEVSTAT*, *Integrity Status*, *IOSTAT*, *Process Status*, and *Smart Error State (SES)*.

status bar
The horizontal bar at the bottom of many applications. The status bar of the Intelligent Sensor Toolkit gives the time and information about the menu choices.

status line
The line of text in the Graphics Toolkit AutoCAD utilities above the drawing area. The status line contains information such as the current drawing layer and the coordinates of the cursor. The Advanced User Interface menu overwrites the status line when moving the cursor to the status line.

STBY
Abbreviation: Standby

step
One of the set of actions in a sequence needed to complete a phase. Step may also be referred to as a control step.

step instruction
A single instruction in a step. This instruction is also referred to as a control instruction.

STI
Acronym: Smart Transmitter Interface

streams
A series of data fields separated by commas (CDV format). representing a configuration item. Streams begin with a keyword called an identifying field. This keyword identifies the stream type (for example, UOC_GRUP). Streams end with the keyword END.

structural return loss
The return loss caused by inconsistent impedance within a coaxial cable due to the physical construction (structure) of the cable.

structured query language (SQL)
A language used to specify how and what information is to be added, deleted, retrieved, or updated in a relational database system.

subgroup
One or more events or measurements used to analyze process performance. Rational subgroups are usually chosen so that the variation represented within each subgroup is as small as possible, and changes in process performance appear between subgroups. Rational subgroups are typically composed of consecutive pieces although random samples are often used.

subnetting
A strategy to divide a TCP/IP network into two or more sub networks using a subnet mask.

substreams
A series of data fields within a stream, separated by commas (CDV format) that begins with a keyword, and continues until the next keyword.

suffix
Additional identifier to deal with having more than one instance of the same device on a loop.

SUP or SUPV
Abbreviation: Supervisory Mode

superior class
A G2 class that is at a higher level than another in the hierarchy of classes. Classes inherit attributes from their superiors. Once inherited, the attributes may then be added to or changed for the subordinate class.

See *Class* and *Hierarchy of Classes*.

supervisory (SUP or SUPV)
A loop control mode: the control algorithm changes the control output to minimize the difference between the values of the setpoint and the process variable. A process computer, a computer program, a unit point, or a logic control point supplies the setpoint value.

supervisory process control system
A computer process monitoring a control system that often sits on top of a distributed control system (DCS). A supervisory process control system is often not redundant, and is suitable for supervisory control on the order of once a minute, not for direct or fast control of continuous values.

SV
Acronym: Secondary Variable

SVA
Acronym: Signal Value Analog

SVD
Acronym: Signal Value Discrete

SVP
Acronym: Signal Value Percent

SVXFR
Acronym: Service Transfer

SW
Abbreviation: Switch, or Software

switch (SW)
See *DIP Switch*.

switchover
The active controller becomes inactive and the standby controller becomes active.

synchronous data link communication (SDLC)
A protocol for communications between synchronized devices. The protocol features bit-level message frames with error checking.

synchronous serial data adapter (SSDA)
1. An integrated circuit device that provides a bidirectional serial interface for synchronous data exchange. This device contains interface logic for simultaneously sending and receiving standard synchronous communications characters.

2. In PROVOX®, an integrated circuit (Motorola 6852) that provides communication between a regulatory controller and an operator station. When an operator plugs a hand-held tuner into the operator station, the SSDA also is the interface to the turner.

synchronous serial transmission
In synchronous serial transmission, a timing signal or clock pulse is transmitted on a separate communication line, or embedded in the data stream so the signal or pulse can be extracted by the receiving device.

HART protocol does not use synchronous transmission.

See *Asynchronous Transmission*.

system administrator
A person who has useful knowledge about the database management system and the operating system of the client. This person will ensure the database is backed up regularly, set up system security, and check to ensure the IIS software is working correctly. To carry out the tasks described above, the system administrator has access to look at and change everything on the system.

systems engineering
The implementation of a hardware-and-software system resulting from analysis of a control problem.

table view work area
The portion of the Table View screen that shows the common tag information in a spreadsheet-like grid display for viewing and editing. The grid display is only a window into the total number of tags available to be viewed.

tag
A unique identifying mnemonic or label for a controller or point of a process control system.

TAG_BODY1
A tag number component representing instrument group function.

TAG_BODY2
A tag number component representing loop number.

tag components
Tag components consist of the tag_prefx1, tag_prefx2, tag_body1, tag_body2, and tag_suffix fields.

tag delimiter
The character used to separate tag components in a tag number (for example, for tag number '1-1-FE-100', the delimiter character between components is '-').

tag index
A tag index in Table View is the list of tags displayed in the Table View Work Area. The tag index is generated on-demand when a user asks for tags to be retrieved.

tag information
Information associated with a tag number, including the components of the tag number itself. The data fields that contain tag information are common between all devices. Some of the information classified in this category is specific to a device, but is grouped here to increase the performance of IIS. Tag information is also referred to as common tag information.

tag number
A unique identifier for a device at a location. A tag number can only represent one device at a time, although it may be assigned different devices over time. This identifier is also referred to as tag name or tag.

tag numbering system
A standardized convention to number tags. The ISA tag numbering convention is one such example.

tag numbering system specific configuration
Includes enabling/disabling a tag numbering system, editing the descriptions for a tag numbering system, setting the tag numbering system component delimiters.

tag permissions
Tag permissions control access to modify tag information.

tag permit
Permission to access a certain tag number, assigned when the tag is created.

TAG_PREFX1
A tag number component representing location.

TAG_PREFX2
A tag number component representing sub-location.

tag set
User-defined lists of tags on which the ENVOX® software can perform functions with a single command, such as document, copy, generate, and download.

TAG_SUFFIX
A tag number component representing suffix.

target device
1. A system device that receives point information, commonly a display device that shows the information to an operator.

2. User-defined lists of tags on which the ENVOX® software can perform functions with a single command, such as document, copy, generate, and download.

task active flag
A two-part communications protocol (transmission control protocol and internet protocol) that provides reliable and guaranteed transfer of data between two computer programs or networks.

task timer
In the ENSTRUCT structure, a timer is included in the code for the sequence control FSTs. The code monitors the time during each task. If a task takes longer than the time allowed, the task timer sends a message number to the message register (lreg 02) for display on the console.

TC
Abbreviation: Thermocouple

TCALHI
Acronym: Transmitter Calibration High

This remote detail display parameter (DDP) attribute, 224:TCALHI, is the calibration block value used to convert the high range value from TEU to percent. This attribute is a single-occurrence DDP, which is tunable. This attribute accepts floating-point tuning data.

See *Calibration Block* and *TEU*.

TCALLO
Acronym: Transmitter Calibration Low

This remote detail display parameter (DDP) attribute, 225:TCALLO, is the calibration block value used to convert the low range value from TEU to percent. This attribute is a single-occurrence DDP, which is tunable. This attribute accepts floating-point tuning data.

See *Calibration Block* and *TEU*.

TCP/IP
Acronym: Transmission Control Protocol/Internet Protocol

telewindows
A product offered by Gensym Corporation that allows more than one workstation to use the same knowledge base.

Tempdb Database
The database in which all temporary tables are created. This database is created by SYBASE when SYBASE is installed.

template
A matrix used to define setpoints for DCD or Group points, or to define alias names for unit operations. The user establishes templates as part of controller configuration.

See *Alias Template, DCD Template, and Group Template*.

temporary condition indicator
In the ENSTRUCT software: a register used to indicate which *temporary condition wait* is active within a PROVOX® step. This communicated variable is referenced to provide the operator with conditional text on his help display, indicating this *temporary condition wait* information. The location of this variable is FPreg[4]:'XXXXX-PC' (where XXXXXis the batch unit tag).

temporary tag
Tag numbers temporarily created to evaluate options. Temporary tags have a revision number of "@".

terminal
1. An I/O device, including a keyboard and monitor, used to communicate between a computer system and a user.

2. A point of connection for two or more conductors in an electrical circuit.

termination panel
An insulated panel containing fuses, power and grounding connections, and terminals for connecting field wiring and cables for I/O channels used by the process control system. Some termination panels also contain signal conditioning modules. Most termination panels are rack-mounted in system cabinets. The customer's application determines the types of termination panels.

tertiary variable (TV)
The third of the HART-defined measured or derived dynamic variables accessible by HART commands from a smart field device. In most cases, the tertiary variable (TV) contains information associated with the process being measured and reported in the *primary variable (PV)*.

See *Dynamic Variables*, *Non-Primary Variables (NPVs)*, *Primary Variable (PV)*, and *Process Variable (PV)*.

test samples
Samples used to judge how well the network works on additional data samples. The samples used in training the network are split into *train* samples and *test* samples. The split into training and test samples is done automatically by the Intelligent Sensor Toolkit. The ratio of training and test samples, and whether the splitting is done sequentially or randomly, needs to be set in the *Options Customize* dialog box. The training algorithm does not optimize over the test samples.

TEU
Acronym: Transmitter Engineering Units

Texas Instruments (TI)
A manufacturer of electronic components, peripheral devices, and computers. PROVOX® devices use many Texas Instruments integrated circuits. PROVOX consoles commonly use a TI printer.

TI
Acronym: Texas Instruments, Incorporated

tile
To size and line up windows such that a user can see every part of every window. Tiling can be vertical or horizontal.

TIM
Abbreviation: Timer

time alignment
Process data and lab test data are not always collected at the same time. The time alignment function corrects for these small offsets in time with the user's choice of algorithm. Example algorithms are: interpolate, mean, and remove.

time delay
It is important not only to know which variables to train, but the time delays associated with the variables. Time delays might be due to process time delays, or measurement time delays, such as delays in receiving lab samples.

timeout
If an expected event does not occur within a specified time, this period is a timeout.

In the HART protocol, there are timeouts for response by a slave to a message from the master device, and for the pause after each transaction, to allow the other master to transmit.

time proportional output (TPO)
An output signal consisting of periodic pulses whose duration is varied to relate, in a prescribed manner, the time average of the output to the actuating error signal.

time span
The length of time between the Start Time and the End Time of a trace on the trend display. A time span is the length of time defined in terms of days, hours, minutes, and seconds, and is not tied to a specific date or time of the day.

The time span for each trace, and not the Start and End Times, is saved with the trend display definition. For example, if the Start Time is 8:00 a.m. and the End Time is 2:00 p.m. on the same day, the time span is six hours. Therefore, when the trend display is viewed several days after being saved, it will initially show current data as a real-time trace using the time span that was set when the trend display was saved.

title bar
The toolbar is a horizontal bar at the top of a window or dialog box containing the title and , usually, the *Control* menu box and **Maximize** and **Minimize** buttons.

.trn file
Acronym: Training File.

token
See *Logical Token*.

token bus
A logically independent network of devices that are physically linked together through a specially shielded coaxial trunk cable using cable taps, drop cables, and communication interfaces.

total download
The process of clearing the ~~old~~ database configuration and reconfiguring the entire database. Current operations and active processes are halted for the duration of the download.

totalizer
A process control computation that acts as an integrator. A totalizer output gives an accumulated total value. A totalizer might be nonresettable, but most will reset to zero when the output reaches either a high limit or a reset indication.

TPO
Acronym: Time Proportional Output

trace
1. To view computer register or accumulator contents throughout the execution of a program.

2. In PROVOX® systems, to view controller register or accumulator contents throughout the execution of an FST, as part of verifying the FST or diagnosing a problem. The trace utility also allows the user to insert specific values in a register or accumulator, to check their influence on the FST, without affecting actual output signals to field devices.

trace point
An FST step at which the operator, using the trace utility, can see the contents of a register or accumulator. Typically, the operator can set as many as 10 trace points in an FST (that is, designate as many as 10 of the FST steps to be trace points).

track control
The ENSTRUCT software function that monitors as many as four conditions for each of eight loops. If one ~~any~~ of the conditions associated with a loop become TRUE, the track control function forces the loop to track a predefined value. The track control function is provided in the continuous control shell mask file TRK-XXXX.MSK.

train
The complete collection of units that are interconnected in a plant so as to allow multiple paths.

train file
The *Design Inputs and Delays* operation creates a file that consists of both training and test observations. All time delays have been performed, so all data used in an interaction is from the same record of data. All filtering has been done, and all observations containing bad data, uncorrected missing data, and outliers have been removed from the train file. The *Design Number of Hidden Neurons* and *Train* operations both require this file.

training
There are two training operations: *Train* and *Design Number of Hidden Neurons*. Both types of training create the model file and estimate the valid regions based on the train and test data.

training file
The same as a train file.

train samples
Samples used in training the network are split into *train* samples and *test* samples. The training only optimizes on the train samples, and uses the test sample to judge how well the network works on additional data samples.

train/test ratio
When the sample files are split into *train* samples and *test* samples, the train/test ratio determines the percentage of samples in each category. This splitting is used both in the *Design Number of Hidden Neurons* and *Train* operations. Modify this in the *Options Customize* dialog box.

train/test split approach
A parameter in the Options Customize dialog box with two choices: *Sequential* and *Random*. Sequential means to split the training file with the first observations to be the training set and the last observations to be the test set. Random means to select samples randomly to be the training set, with the unselected samples to be the test set.

transaction
A series of messages used to convey useful information from one station to another. This series might include acknowledgements or retries after detecting errors.

transaction log
A log file maintained by the dataserver of all modifications to the database. As additions, updates, and deletions are performed on data, these changes are written to the transaction log. Once the changes have been accepted by the user process and the transaction is complete, the changes are applied to a data file in the database. If processing errors or system failures occur, transactions which have not been properly completed are not applied to the data file, and the memory cache copy of the affected data is restored from the data file. The transaction log is *not* the Audit Trail log, but rather contains SYBASE-only information.

transceiver cable
Ethernet/IEEE 802.3 transceiver cable provides the link between the system or server and the Ethernet Transceiver or DELNI.

transducer
1. A device that, when activated by signals from one or more systems or media, supplies related signals to one or more other systems or media.

2. An element or device that receives information in one form and converts it into information in the same or another form.

See *Highway Addressable Remote Transducer (HART)*.

transistor-transistor- logic (TTL)
A popular family of integrated circuit devices for logic functions. These devices have arrays of bipolar transistors in which voltages below 0.7 volts represent a logical 0, and voltages above *2.*4 volts represent a logical *1.*

transmission control protocol/ internet protocol (TCP/IP)
A general-purpose network communications software product.

See *DECnet*.

transmitter
A device which measures the controlled variable of a process and converts this measurement into a standard transmission signal such as 3 to 15 psig or 4 to 20 milliamps. Usually the desired output signal is one that is proportional to the controlled variable.

transmitter engineering units (TEU)
Some smart field devices do not directly measure the quantity that the PROVOX® system needs to control. For example, a differential pressure transmitter sends data in *transmitter engineering units (TEU)*, which in this case is pressure. The PROVOX system then converts the pressure to *process engineering units (PEU)*, which might be gallons per minute (the measurement in the desired process units).

For direct inputs from smart field devices, the TEU and PEU are the same. For indirect inputs, the TEU and PEU are not necessarily the same. If indirect, the user must configure the ENVOX® (P3.3) CALIBRATION BLOCKS form to define the relationship between TEU and PEU.

See *Calibration Blocks* and *Process Engineering Units (PEU)*.

transmitter variable
See *Non-Primary Variable (NVP)*.

travel
How far a valve has opened, in a percent of ranged travel (usually 0% to 100%).

See *Alert* and *Valve Output*.

trend
A graphical/historical display of operational data on the console display screen.

trend data
A sequence of values collected from highway devices using the CHIP application.

trending
The collecting and recording of operational data for the comparison of current and previous operations.

trend plot display
Data which may be recalled as needed, defining the characteristics of a trend display. These characteristics include the:

- plot name and description
- number of traces shown together in the same display
- source of the data (for instance, point tag, attribute, occurrence, reduction, historical data file)
- high and low scales
- default time span displayed

trend set
A data block composed of a maximum of six trend traces.

trend trace
Data for a single attribute value that the console gathers during a specific period of time and displays graphically at the console. The operator selects the sample interval ranging from five seconds to 60 minutes. The console displays a maximum of 60 samples in a line graph format with time represented by the horizontal axis and engineering unit span represented by the vertical axis.

trend type
Trend data storage location. Two valid data trend types are historic write and historic read.

trend window
The frame in which the console graphically displays the trend set data. The window displays previous data at the left of the screen and the most recent at the right. The window also displays specific information concerning the trend points. Windows are available in three sizes: full, half and quarter-size.

trip point
See *Alarm Trip Point*.

TTL
Acronym: Transistor-Transistor Logic

tuning
The adjustment of control terms or parameter values to produce a desired control effect.

tuning parameter
A parameter that is adjustable without reconfiguration; an operator adjusts such a parameter to alter control effects. Common examples are gain, rate, reset, and alarm trip points. Such parameters appear in detail displays.

twenty-series (SR90) controllers
A family of units that provides data acquisition, continuous control, and batch control. The control I/O subsystem includes analog, discrete, and serial data inputs and outputs. The controller and I/O have a range of redundancy and may be located at remote sites.

type 1 error
The incorrect decision that a process is unacceptable when, in fact, perfect information would reveal that it is located within the zone of acceptable processes. See *Alpha*.

UAF
Acronym: User Authorization File

UART
Acronym: Universal Asynchronous Receiver/Transmitter

UCL
Acronym: Upper Control Limits

UCX
Acronym: DEC TCP/IP Services for OpenVMS VAX

A layered software product that provides interoperability and resource sharing between OpenVMS VAX systems, DEC AXP systems, UNIX systems, and other systems that support the TCP/IP protocol suite and Sun Microsystems NFS. This product provides network file access, remote terminal access, remote command execution, remote printing, mail, and application development.

UDC
Acronym: Unsolicited Data Control

UDF
Acronym: microPROVOX™ Display Format

UDFACAD
The Graphics Toolkit utility that automates the conversion of UDF files to AutoCAD.

UDFTODXF
The Graphics Toolkit utility that converts UDF files to AutoCAD DXF files.

UDFTOOPI
The Graphics Toolkit utility that converts UDF files to microPROVOX™ OPI files.

UDK
Acronym: User-Defined Key

UIC
Acronym: User Identification Code

UL
Acronym: Underwriters Laboratories

ultraviolet light erasable ROM (UVROM)
Another name for ultraviolet read-only memory.

ultraviolet read-only memory (UVROM)
A special type of ROM. Exposure to intense ultraviolet light erases the ROM contents.

ULTRIX
Mark of Digital Equipment Corporation for one of the firm's computer operating systems.

Underwriters Laboratories (UL)
An American agency that tests electrical products, approving those products that meet safety standards.

.und file
Temporary file to store a copy of the `.net` FILE.

uninterruptible power supply (UPS)
A backup device for the AC power source. A UPS connects between the AC power source and computer equipment. Should there be a failure of or interruption in the AC power source, the UPS supplies continuous power to the computer.

unit
1. A defined group of specific process equipment that processes a particular batch. For control purposes, such a unit is one entity.

2. A PROVOX® point type. A unit point has many attributes, enabling it to control the execution of a unit operation.

unit operation
In batch control, a list of controller instructions to perform specific mathematical and logical functions, as part of a time-and-event sequence for a defined set of equipment (the unit). A unit operation consists of phases, each of which is a set of related steps. Each step is an elemental control action.

unit operations controller (UOC)
A PROVOX® controller designed for batch, sequencing, discontinuous, and unit-oriented continuous-control applications. A UOC includes FST and LCP functionality.

unit operations controller+ (UOC+)
A unit operations controller (UOC) with advanced control, including function sequence table (FST) and logic control point (LCP) functionality, an expanded database, and faster processing.

unit operations controller discrete input (UOC-DI)
A PROVOX® point type: a single-bit discrete input value generated by unit operations controller (UOC), integrated function controller (IFC) and SR90-Series devices.

unit operations controller discrete output (UOC-DO)
A PROVOX® point type: a single-bit discrete output value generated by UOC, IFC and SR90 series devices.

unit point tag
A unique name for identifying a unit point in the configuration database.

unit set
A set of units that defines the default units of measurement for all forms in the IIS formset.

unit variable initialized flag
In the INSTRUCT software: a unit variable which is used to confirm that the variables of a specific phase have been initialized. The location of this variable is UV 23 of a batch unit.

universal asynchronous receiver/transmitter (UART)
An integral circuit chip that converts a byte of data (usually presented by the processor in parallel) to and from serial form, and adds or removes the start, parity, and stop bits. The UART can be configured to use 7 or 8 bit data, odd, even, or no parity, and a standard baud rate.

At the receiving end, the UART checks parity and the character frame format, and reports ~~any~~ errors to the controlling processor.

universal condition
1. A process condition that forces the operation of a batch to FAIL if the condition becomes true.

2. HART protocol commands recognized by all smart field devices.

See *Common-Practice Commands* and *Device-Specific Commands*.

UNIVOX
A line of self-contained process control systems formerly-manufactured by Fisher-Rosemount Systems.

UNIX
Registered trademark of UNIX System Laboratories, Inc.

unload file
A specific type of data file used by the Documentation Toolkit software to unload AutoCAD drawing information into a database using a data link.

unsolicited
An automatic, repetitive reporting method for routine operating data.

unsolicited data control (UDC)
An improved method of unsolicited data reporting. UDC provides <u>the</u> ~~better~~ integrity of unsolicited messages sent from one local area to another.

UOC
1. Acronym: Unit Operations Controller

2. The type of Recipe Manager unit variable that establishes a link between units for coordinated operations.

UOC+
Acronym: Unit Operations Controller+

UOC-DI
Acronym: Unit Operations Controller Discrete Input

UOC-DO
Acronym: Unit Operations Controller Discrete Output

upload
1. The movement of detail display parameters from system devices to a configuration device. An upload lets the current values of parameters be incorporated into existing configuration source files, eliminating user entry specific tuning changes.

2. The process of updating the ENVOX® configuration database with device tuning parameter values initiated by the operator for a device that is on-line.

upper control limit (UCL)
See *Control Limit*

UPS
Acronym: Uninterruptible Power Supply

URG
Abbreviation: Urgent

user authorization file (UAF)
UAF> is the prompt for the VMS Authorization utility.

user-defined
Information set by the user.

user-defined key
See *Macro*.

user form set
Form set modified by the user for their implementation of IIS.

USEREXP table
Table where users may add columns which will appear in Table View.

user ID
The name IIS stores to identify each user. The system administrator is responsible for assigning user IDs.

user identification code (UIC)
VMS uses UIC to identify users and groups of users. The code consists of two parts: group and member identifiers.

utility programs
Standard useful programs, such as programs for sorting files, copying disks, importing files, downloading information, and performing diagnostics.

UVROM
Acronym: Ultraviolet Read-Only Memory or Ultraviolet Light Erasable ROM

validity interval
The length of time that the value of a G2 variable stays current.

See *Variable*.

ValveLink™ software
A mark of Fisher Controls for the FIELDVUE ValveLink Series VL2000 software, which runs on a personal computer and can be used to configure, calibrate, and diagnose the operating characteristics of digital transducer/digital valve controller (DT/DVC) instruments.

See *FIELDVUE*, and *HART_CHANNEL Utility*.

valve output (VO)
A controller voltage or current output that can be used by an actuator to open or close a valve (in PROVOX® systems, the term *implied valve position* is a synonym).

valve output tracking (VOT)
See *Output Tracking*.

variability
Exhibiting a variation. Most typically a change or difference in a particular process.

variable
1. A factor or condition that can be measured, altered, or controlled (for example, pressure, temperature, and flow).

2. The symbolic representation of a logical storage location containing a value that changes during a processing operation.

3. A tunable value that is used in batch code, conditions, timers, and so on. Variables reside in the variable FSTs (VAR-CC21 through VAR-CC30) and are initialized to their configured values after a total download. As many as 640 variables per controller can be defined: 320 integer values and 320 floating-point values. Tune variables using the TUNE MODE or CHIP.

See *Controlled Variable*, *Dynamic Variables*, *Measured Variable*, *Non-Primary Variables (NPVs)*, and *Process Variable (PV)*.

variable FST
This group of FSTs (VAR-CC21 through VAR-CC30) contains the logic that gives the variables their initial configured values.

variable index number
In the ENSTRUCT software: a unique number that defines a variable by its type (integer or floating-point), controller number, LCP number, and register number. Its format is:

TCCLLRR where

T is the type of variable

CC is the controller number

LL is the LCP number (21 through 30)

RR is the register number (01 through 16)

variables
Quantities subject to change or variability.

variables data
Quantitative data used for process analysis.

variance
The square of the standard deviation.

variation
The difference among individual outputs of a process resulting from common and special causes.

VAX
1 . A mark of Digital Equipment Corporation for several lines of the firm's computers

2. Acronym: Virtual Address eXtension.

VCIA
Acronym: VME Communications Interface Assembly

VDU
Acronym: Video Display Unit

velocity limit
A restriction on the rate of change of a particular variable.

verify
The operation done after the training is completed to test the neural net on data it has not seen before. A trained neural net might be verified many times on a periodic basis. Certifying a neural network prior to using it, and checking a calibrated neural network after it is in use, are both examples of the need to verify neural nets.

versa module eurocard bus (VME-bus)
A 32-bit backplane bus that has become an industry standard. The bus uses separate data and address lines. The backplane uses pin and socket connectors.

vertical scalability
The ability to run IIS on different hardware platforms of different computational abilities.

VGA
Acronym: Video Graphics Array

video display unit (VDU)
An electronic assembly that displays alphanumeric data and graphic images on a screen, for viewing by a user.

video graphics array (VGA)
A standard for video monitors and video cards.

VIEWPDF
This Graphics Toolkit PC-based program previews a PDF file on the PC monitor. VIEWPDF provides a way to view a display before moving it to the PROFLEX® or ENVOX® configuration.

VIEWUDF
This Graphics Toolkit PC-based program previews a UDF file on the PC monitor. VIEWUDF provides a way to view a display before moving it to the microPROVOX™ system.

virtual address extension (VAX)
A mark of Digital Equipment Corporation for several lines of the firm's computers.

virtual condition
In the ENSTRUCT software: a condition that is transported over the highway and placed into the virtual condition database of all of the other controllers in the system. The first 64 conditions of each controller are its virtual conditions.

virtual condition database
An area in a controller designated for storage of the virtual condition results of the other controllers in the network.

virtual memory system (VMS)
A computer operating system of Digital Equipment Corporation that provides an operating environment for technical applications of VAX computers.

VME-bus
Acronym: Versa Module Eurocard Bus

VME Communications Interface Assembly (VCIA)
An interface card and adapter assembly that connects the DC6460-Series Console Electronics Unit (VME-bus) to the PROVOX® data highway. The VCIA card provides the timing and data conversion necessary for communications. The VCIA adapter assembly mounted on the backplane connects two internal coaxial cables to two BNC connectors on the data highway connection panel.

VME Redundant Communications Interface Assembly II (VRCIA II)
An interface adapter assembly that connects the DC6460-Series Console Electronics Unit (VME-bus) to the PROVOX® Highway II token passing bus. The VRCIA II adapter provides the timing and data conversion necessary for communications. The VRCIA II has coaxial connectors for the primary and secondary highway cables. Right-angle adapters are required for the coaxial connectors.

VME subsystem bus (VSB)
An internal data pathway on a backplane overlay board that carries signals to and from the rtSBC and an optional memory card.

VMS
Acronym: Virtual Memory System

A mark of Digital Equipment Corporation for one of the firm's computer operating systems; an acronym for Virtual Memory System. VMS provides an operating environment for technical applications of VAX computers.

VO
Acronym: Valve Output or Voltage Output

voltage output (VO)
A terminal, available on a PROVOX® controller or multiplexer, that produces a 1- to 5-volt analog output signal.

VOT
Acronym: Valve Output Tracking

VRCIA II
Acronym: VME Redundant Communications Interface Assembly

VSB
Acronym: VME Subsystem Bus

WAITUNTIL indicator
In the ENSTRUCT software: a register used to indicate the active WAITUNTIL instruction within a PROVOX® step. This communicated variable references to provide the operator with conditional text on his display, indicating this WAITUNTIL information. The location of this variable is FPreg[3]:'XXXXX-PC' (where XXXXX is the batch unit tag).

WAN
Acronym: Wide Area Network

WARN
Abbreviation: Warning

watchdog timer (WDT)
1 . An electronic timer that generates a priority interrupt unless periodically recycled by a computer or microprocessor. Should the computer or microprocessor fail, the timer does not recycle the timer, which sends out the interrupt signal, which normally shuts down the system.

2. A regulatory controller software timer used with DCPs operating in DDC or supervisory modes. If the time interval between receipt of DDC or supervisory change requests exceeds the WDT timeout time, the DCP switches to the configured backup mode (Auto or Manual).

WDT
Acronym: Watchdog Timer

weigh scale interference (WSI)
A boundary device between the PROVOX® control system and a field device that determines either the mass or the weight of a body, depending upon the apparatus and procedures used.

weight
A constant numeric factor associated with a connection. The strength out of a connection can be thought of as the strength of the signal going into the connection times the weight. The weights can be seen by viewing the model file.

***whenever* rule**
A G2 rule that initiates activity whenever a variable receives a value, whenever a variable fails to receive a value, or whenever an object is moved on a workspace.

See *Object*, *Variable*, and *Workspace*.

wide area network (WAN)
A group of electronic devices that are far from each other (in different places, different regions, or different nations) but which work together. The devices communicate over such media as cable, microwave links, and satellite links. Wide-area-network communication includes a switching capability.

wildcard
A character or characters to allow copying, renaming, or deleting of multiple files. In DOS, the two wildcard characters are * and ?. For safety, the copy, rename, and delete functions inside of the Intelligent Sensor Toolkit do not support wildcards.

window
1. A particular type of console display that has a specific purpose. A DDP window, for example, shows point DDP information. A trend window shows trend set information. An application window emulates a computer terminal.

2. A trace utility mode, in which accumulator values appear on the console screen as trace point FST steps execute, but FST execution does not stop at trace points.

3. For PCs, the area of a computer screen within which an application runs. There may be multiple windows running at one time.

windowing
The movement of trend data across the trend window. This left-to-right or right-to-left movement permits the user to view data recorded at a specific point in time.

window manager
A program that controls the size, placement, and operation of windows in the Window or workspace.

Windows desktop window
Microsoft's term for the main window in Windows.

word
The fundamental unit of data storage used by a computer, usually 16 bits long. The number of bits can be different in some computers or microprocessors, however, varying from 4 to 64 bits.

workplace console (WPCON)
ENVOX® software uses the acronym WPCON in forms and menu options that are used solely to configure Operator Workplace consoles.

See *Operator Workplace*.

workspace
1. Another name for the console window. This area is also referred to as the desktop or root window.

2. A G2 screen on which objects, connections, statement boxes, displays, and other knowledge-based items can be placed.

See *Object*.

workstation
A small to medium sized, usually single-user computer. Examples of workstations are IBM RS/6000, Sun computers, DECStations, VAXStations and many other VAXs.

WPCON
Acronym: Workplace Console.

See *Operator Workplace*.

WSI
Acronym: Weigh Scale Interface

W3DBLIB.DLL
W3DBLIB.DLL is the DB-Library binary that provides SQL communications between the IIS client and the IIS server.

XFR
Abbreviation: Transfer

XMIT
Symbol: Transmit

XMTR
Abbreviation: Transmitter

XOR
Acronym: Exclusive OR

X Server
The graphic terminal providing the operator's interface with the console. The X Server is the terminal on which the Console Software functions are performed.

X Session
The period of time when an individual user is performing process control functions from the X Server on which the Console Software is active. X Session is also referred to as a session.

X Terminal
The hardware assembly consisting of a VDU, a keyboard and mouse, and the electronics necessary to run the server software of an X Window System-based application.

X.25
A CCITT protocol for connecting data terminal equipment to public packet switched networks.

X Window System
The X Window System is an industry standard on which the PROVUE® and Operator Workplace console software's graphical user interface was ~~has been~~ developed. The window system is based on the client-server architecture model.

zoom
To enlarge a portion of a graph to fill the whole screen. The user can zoom either by clicking on two points in the graph with the mouse or trackball, or by selecting the *Zoom* tool (which looks like a magnifying glass) to zoom on the first half of the graph.

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3 Acronym and Abbreviation List

A

ABINT
Acronym: Allen-Bradley Interface

AC or ac
Acronym: Alternating Current

ACIA
Acronym: Asynchronous Communications Interface Adapter

ACK
Abbreviation: Acknowledge

ACQ
Abbreviation: Acquire

ACS
Acronym: Advanced Control Solutions

ACT
Abbreviation: Active

A/D
Acronym: Analog-to-Digital, or Analog to Digital Converter

ADC
Acronym: Analog to Digital Converter

ADLC
Acronym: Advanced Data Link Control

ADR
Acronym: Advanced Data Reporting

AEUP
Acronym: Auxiliary Engineering Unit Pair

AFC
Acronym: Advanced Flow Control

AFP
Acronym: Auxiliary Function Parameter

AI
1. Acronym: Analog Input
2. Acronym: Artificial Intelligence

AIN
Acronym: Analog Input/Output

AIO
Acronym: Analog Input/Output

AIU
Acronym: Alarm Interface Unit

AIX
Acronym: Advanced Interactive eXecutive

ALM
Abbreviation: Alarm

ALU
Acronym: Arithmetic Logic Unit

ANOVA
Abbreviation: Analysis of Variance

ANSI
Acronym: American National Standards Institute

AO
Acronym: Analog Output

AOUT
Acronym: Analog Output Instruction

APU
Acronym: Arithmetic Processing Unit

ARIMA
Abbreviation: Auto Regressive Integrated Moving Average

ARW
Acronym: Anti-Reset Windup

ASCII
Acronym: American Standard Code for Information Interchange

ASE
Acronym: Automatic Switchover Enable

ASL
Acronym: Application Software Library

ASSY
Abbreviation: Assembly

ATTR
Abbreviation: Attribute

AUI
Acronym: Access Unit Interface

AUT or AUTO
Abbreviation: Automatic Mode

AUX
Abbreviation: Auxiliary

AUX EU
Acronym: Auxiliary Engineering Units

AVP
Acronym: Actual Valve Pressure/Position

AWD
Acronym: Alternative Working Directory

AWG
Acronym: American Wire Gauge

B

BCD
Acronym: Binary-Coded Decimal

BCOMP
Abbreviation: Batch Computer

BCON
Acronym: Batch Console

BCU
Acronym: Backup Control Unit

BDAS
Acronym: Basic Data Acquisition System

BDM
Acronym: Batch Data Manager

B&G
Acronym: Bias and Gain

bit
Abbreviation: binary digit

bps
Acronym: bits per second.

BREG
Acronym: Boolean Register.

BSI
Acronym: British Standards Institute

C

CAD
Acronym: Computer Aided Design

CAP
Abbreviation: Capacitor

CASC
Abbreviation: Cascade Control

CCITT
Acronym: Comite Consultatif International pour Telephonie et Telegraphie, or International Consultative Committee for Telephony and Telegraphy. See *International Consultative Committee for Telephony and Telegraphy*.

CCOMP
Acronym: Custom Computer

CCON
Acronym: Custom Console

CDV
Acronym: Comma Delimited Values

CEU
Acronym: Continuing Education Unit

CFG
Abbreviation: Configuration

CFOC
Acronym: Custom Format Operator's Console

CHAN
Abbreviation: Channel

CHIP
Acronym: Computer/Highway Interface Package

CHK
Abbreviation: Checksum

CIA
Acronym: Communications Interface Assembly

CIM
Acronym: Computer Integrated Manufacturing

CIU
Acronym: Computer Interface Unit

CJC
Acronym: Cold Junction Compensator

CMD
Abbreviation: Command

CMOS
Acronym: Complimentary Metal Oxide Semiconductor

CMPTR
Abbreviation: Computer Mode

CNSL
Abbreviation: Console

CO
Acronym: Current Output

COG
Abbreviation: Center Of Gravity

COM
Abbreviation: Computer Mode

COMM
Abbreviation: Communications

CONFIG
Abbreviation: Configuration

CPI
Acronym: Characters Per Inch

CPU
Acronym: Central Processing Unit.

CRC
Acronym: Cyclic Redundancy Check

CRI
Acronym: Control Room Instrumentation

CRT
Acronym: Cathode Ray Tube.

CSA
Acronym: Canadian Standards Association

CSV
Acronym: Comma Separated Value

CTD
Acronym: Console Trend Display

CU MPU
Acronym: Control Unit Microprocessor Unit

CWEN
Acronym: Cancel Wait Enable

D

D
Abbreviation: Derivative Control Action (Rate)

D/A or DAC
Acronym: Digital to Analog, or Digital to Analog Converter

DAI
Acronym: Derived Analog Input

dB
Acronym: Decibel

DBI
Acronym: Database Index

DBMS
Acronym: database management system

dBmV
Acronym: Decibel millivolt

DBND
Abbreviation: Deadband

dc
Acronym: direct current

DC
1. Acronym: Data Concentrator
2. Acronym: Direct Current

DCD
Acronym: Discrete Control Device

DCE
Acronym: Data Communications Equipment

DCL
Acronym: Digital Command Language

DCP
Acronym: Direct Control Point

DCPC
Acronym: Dual Channel Port Controller

DCS
Acronym: Distributed Control System

DCU
Acronym: Data Concentrator Unit (same as data concentrator)

DDC
Acronym: Direct Digital Control

DDP
Acronym: Detail Display Parameter

DDPRD
Acronym: DDP Read

DDPWT
Acronym: DDP Write

DEC
Acronym and mark: Digital Equipment Corporation

DESCR
Abbreviation: Descriptor

DEV
Abbreviation: Device

DEVSTAT
Acronym: Device Status

DH
Acronym: Data Historian

DI
Acronym: Discrete Input

DIAGS
Abbreviation: Diagnostics

DIGCOMM
Abbreviation: Digital Communication

DIO
Acronym: Discrete Input/Output

DIP
Acronym: Dual In-line Package

DLL
Acronym: Dynamic Link Library

DM
Acronym: Discrete Monitor

DMA
Acronym: Direct Memory Access

DMC
Acronym: Dynamic Matrix Control

DO
Acronym: Discrete Output

DP
Acronym: Data Processing Printing Style

DPS
Acronym: Dot Pattern Set

DR
Acronym: Display Read-ROM (for PCON)

DRVR
Abbreviation/acronym: I/O Driver

DSE
ENVOX® threaded binary file.

DSP
1. Abbreviation: Display

2. Acronym: Distributed Systems Products

3. Acronym: Digital Signal Processing

DSR
Acronym: Direct Screen Reference

DT
Acronym: Digital Transducer

DT/DVC
Acronym: Digital Transducer/Digital Valve Controller

DTE
Acronym: Digital Terminal Equipment

DVC
Acronym: Digital Valve Controller

DVM
Acronym: Digital Volt Meter

DW
Acronym: Display Write-RAM (for PCON)

DXF
Acronym: Drawing eXchange Format

E

EAROM
Acronym: Electrically Alterable Read-Only Memory

ECF
Acronym: Element Control FST

ED
Acronym: Emergency Download

EDAS
Acronym: Extended Data Acquisition System

EEPROM
Acronym: Electronic Erasable Programmable Read-Only Memory

EIA
Acronym: Electronic Industries Association

EMI
Acronym: Electromagnetic Interference

EMX
Acronym: Expanded MUX Controller

ENB or ENBL
Abbreviation: Enable

EOT
Acronym: End of Transmission

EPCI
Acronym: Extended Pulse Count Input

EPROM
Acronym: Erasable Programmable Read-Only Memory

ERR
Abbreviation: Error

ESD
Acronym: Electrostatic Damage

ESDS
Acronym: Expert System Data Server

EU
Acronym: Engineering Units

EU 0%
Acronym: Engineering Units 0% Value

EU 100%
Acronym: Engineering Units 100% Value

EUHV
Obsolete acronym: Engineering Units High Value (replaced by HIEC: High Engineering Units Scale Factor)

EULV
Obsolete acronym: Engineering Units Low Value (replaced by LOEC: Low Engineering Units Scale Factor)

EWMA
Acronym: Exponentially Weighted Moving Average

EXP
Abbreviation: Expected

EXT
Abbreviation: Extended or External In a PROVOX® device, EXT usually refers to an External Interface card.

F

F-C-C:A
Acronym: File-Card-Channel:Attribute

FCS
Acronym: Frame Check Sequence

FDFWD
Acronym: Feedforward

FET
Acronym: Field Effect Transistor

FF
Acronym: Feedforward

FIC
Acronym: Flow Indicating Controller

FIFO
Acronym: First In, First Out

FIL
Abbreviation: Filter

FORTRAN
Abbreviation: Formula Translation

FPREG
Acronym: Floating Point Register.

FSK
Acronym: Frequency Shift Keying, phase coherent

FST
Acronym: Function Sequence Table

FTIM
Acronym: Filter Time Constant

FUDGE
Acronym: Fisher Universal Documentation Graphics Editor

FV
Acronym: Fourth Variable

FWD
Abbreviation: Forward

G

GND
Abbreviation: Ground

GPF
Acronym: General Protection Fault

GPIB
Acronym: General Purpose Interface Bus

GSI
Acronym: G2 Standard Interface

GUI
Acronym: Graphical User Interface

H

HART
Acronym: Highway Addressable Remote Transducer

HCF
Acronym: HART Communication Foundation

HDF
Acronym: Historical Data File

HDL
Acronym: Highway Data Link

HDLC
Acronym: High-Level Data Link Control

HIEC
High Engineering Units Scale Factor

HIU
Acronym: Highway Interface Unit

HMAN
Abbreviation: Hard Manual Mode

HP
Acronym: Hewlett-Packard

HPIB
Acronym: Hewlett-Packard Interface Bus

HZ
Abbreviation: Hertz

I

I
Abbreviation: Integral (Reset) Control Action

IAC
1. Acronym: (adjective) Interactive
2. Acronym: (noun) Interactive Controller

IC
Acronym: Integrated Circuit

ICA
Acronym and IBM mark: Industrial Control Architecture

ICP
Acronym: Indirect Control Point

IDI
Acronym: Intelligent Device Interface

IDL
Acronym: Inter-Driver Link

IEC
Acronym: International Electrotechnical Commission

IEEE
Acronym: Institute of Electrical and Electronics Engineers

IFC
1. Acronym: Integrated Function Controller
2. Acronym: Input File-Card-Channel

IIS
Acronym: Instrument Information System™

I-lock
Abbreviation: Interlock

ILOPCD
Acronym: Illegal Operation Code

INAC
1. Abbreviation: Inactive
2. Acronym: Increase To Close

IND
Abbreviation: Indicator

INTEG
Abbreviation: Integrity

INTG
Abbreviation: Integrity

IO or I/O
Acronym: Input/Output

IOFVAL
Acronym: I/O Fail Value

IOSTAT
Abbreviation: I/O Status

I/P
Acronym: Input/output

IREG
Acronym: Integer Register.

ISA
Acronym: Instrument Society of America

ISO
Acronym: International Standards Organization

ISTK
Acronym: Intelligent Sensor Toolkit

IVP
Acronym: Implied Valve Position

K

K
Symbol: Fixed Gain

KB
Abbreviation: Keyboard

kg
Abbreviation: kilogram

K-S Test
Abbreviation: Kolmogorov-Smirnov Goodness of Fit Test

L

LAN
Acronym: Local Area Network

LCL
Acronym: Lower Control Limit

LCON
Acronym: Large Database Console

LCP
Acronym: Logic Control Point

LD
Acronym: Local Device

LED
Acronym: Light-Emitting Diode

LGP
Acronym: Local Ground Point

LIFO
Acronym: Last In, First Out

LIU
Acronym: LCON Interface Unit

LM
Abbreviation: Limit

LO
Abbreviation: Low

LOEC
Acronym: Low Engineering Units Scale Factor

LPI
Acronym: Lines Per Inch

LPM
Acronym: License Personality Module

LQ
Acronym: Letter Quality Printing Style

LR
Acronym: Link Read-ROM (for PCON)

LRC
Acronym: Longitudinal Redundancy Check

LSD
Acronym: Least Significant Digit

LSP
Acronym: Last Setpoint

LTD
Acronym: Local Traffic Director

LU
Acronym: Logical Unit

LW
Acronym: Link Write-RAM (for PCON)

M

m
Abbreviation: meter (also spelled *metre*)

MAN
Abbreviation: Manual Mode

MAX
Abbreviation: Maximum

mb
Abbreviation: megabyte

Mbps
Acronym: Million bits per second

MCA
Acronym and IBM mark: MicroChannel Architecture

MGP
Acronym: Master Ground Point

MIN
Abbreviation: Minimum

mm
Abbreviation: millimeter

MMI
Acronym: Man Machine Interface

MPC
Abbreviation: Model Predictive Control

MPU
Acronym: Microprocessor Unit

MSD
Acronym: Most Significant Digit

MUX
Abbreviation: Multiplexer

MUX-AI
Acronym: Multiplexer Analog Input

MUX-AO
Acronym: Multiplexer Analog Output

MUX-DI
Acronym: Multiplexer Discrete Input

MUX-DO
Acronym: Multiplexer Discrete Output

MUX-PCI
Acronym: Multiplexer Pulse Count Input

MV
Acronym: Measured Variable or Multivariable

MVP
Acronym: Multivariable Point

N

NAK
Acronym: Negative Acknowledgement

NAN
Acronym: Not A Number

NC
Acronym: Normally Closed

ND
Acronym: Network Device

NIU
Acronym: Network Interface Unit

NNet
Abbreviation: Neural Net

NO
Acronym: Normally Open

NOS
Acronym: Network Operations Server

NPV
Acronym: Non-Primary Variable

NSR
Acronym: Non-Self-Regulating

NTD
Acronym: Network Traffic Director

NVM
Acronym: Non-Volatile Memory

O

OAL
Acronym: Operator Attention List

OAR
Acronym: Operator Action Request

OCC
Abbreviation: Occurrence

OEM
Acronym: Original Equipment Manufacturer

OFCC
Acronym: Output File-Card-Channel

OP AMP
Acronym: Operational Amplifier

OSI
Acronym: Open Systems Interconnection

OT
Acronym: Output Tracking

OUT
Abbreviation: Output Signal

OWP
Acronym: Operator Workplace

P

P
Abbreviation: Proportional Control Action (Gain)

PAL
Acronym: Programmable Array Logic

PARAM
Abbreviation: Parameter

PB
Acronym: Proportional Band

PBM
Acronym: Push-Button Module

PC
Acronym: Printed Circuit, Programmable Controller, or Personal Computer

PCA
Acronym: Primary Control Algorithm

PCALHI
Acronym: Process High Range Limit

PCALLO
Acronym: Process Low Range Limit

PCI
Acronym: Pulse Count Input

PCIU
Acronym: Programmable Controller Interface Unit

PCL
Acronym: Process Control Language (CIM/21 term)

PCOMM
Acronym: PROVOX® Common Area

PCON
Acronym: Preformatted Console

PD
Acronym: Proportional/Derivative Control Action

PDC
Acronym: Process Dynamics Compensator

PDF
Acronym: PROVOX® Display Format

PDM
Acronym: Parallel Discrete Monitor

PDO
Acronym: Parallel Discrete Output

PDS
Acronym: Process Data Server

PE
Acronym: processing element

PEMS
Acronym: Predictive Emissions Monitoring System

PEU
Acronym: Process Engineering Units, or Percent to Engineering Units Conversion

PFR
Acronym: Power Fail Restart

PFST
Acronym: Pseudo Function Sequence Table

PI
Acronym: Proportional/Integral Control Action or Process Instrumentation

PIA
Acronym: Parallel Interface Adapter or Peripheral Interface Adapter

PID
Acronym: Proportional/Integral/Derivative Control Action

P&ID
Acronym: Process and Instrument Diagram

PIF
Acronym: Program Information File in MS Windows

PIO
Acronym: Process Input/Output

PI_PID_I
Acronym: Proportional/Integral—Proportional/Integral/Derivative Control Action

PKT
Abbreviation: Packet

PLC
Acronym: Programmable Logic Controller

PMA
Acronym: Plant Management Area

PMC
Acronym: Process Manager's Console

PMC(B)
Acronym: Process Manager's Console Batch

PMC(C)
Acronym: Process Manager's Console Custom

PMC(P)
Acronym: Process Manager's Console Preformatted

PMCS
Acronym: Process Manager's Computer System

PPA
Acronym: Plant Process Area

P_PD
Acronym: Proportional—Proportional/Derivative Control Action

PRC HIGH
Abbreviation: Process High Range

PRC LOW
Abbreviation: Process Low Range

PRI
Abbreviation: Primary

PROM
Acronym: Programmable Read-Only Memory

PSC
Acronym: Power Supply Common

PSI
Acronym: Programmable Serial Interface

PSU
Acronym: Power Supply Unit

PT
Abbreviation: Point

PTM
Acronym: Pulse Time Multiplex

PV
Acronym: Process Variable or Primary Variable (HART term).

PVE
Acronym: PROVUE® Electronics

PWB
Acronym: Printed Wiring Board

PWR
Abbreviation: Power

Q

Q & A
Acronym: Question and Answer

QLD
Acronym: Question List Display

R

RAM
Acronym: Random-Access Memory

RAT
Abbreviation: Ratio

RBGW
Acronym: Red, Blue, Green, White

RBL
Acronym: Rosemount Basic Language

RCIA II
Acronym: Redundant Communication Interface Assembly II

RCM
Abbreviation and IBM mark: Realtime Computer Microcode

RCV
Abbreviation: Receive

RDBI
Acronym: Relative Database Index

RDBMS
Acronym: Relational Database Management System

REC AO
Acronym: Data Record Analog Output

RED
Abbreviation: Redundant

REM O/S
Acronym: Remote Out of Service

REQ/RESP
Acronym: Request/Response

RETMA
Acronym: Radio, Electronic, and Television Manufacturers' Association

RFI
Acronym: Radio Frequency Interference

RGB
Acronym: Red, Green, Blue

RGBW
Acronym: Red, Green, Blue, White

RIC
Acronym and IBM mark: Realtime Interface Coprocessor

RMP
Abbreviation: Ramp

%RNG
Abbreviation: Percent of Range (used on controller point faceplates).

ROM
Acronym: Read-Only Memory

RSP
Acronym: Remote Setpoint Mode

RST
Abbreviation: Restart

RST MD
Acronym: Restart Mode

RTD
Acronym: Resistance Temperature Detector

RTE
Acronym: Real Time Executive

rtSBC
Acronym: Real-time Single-board Computer

RWM
Acronym: Read/Write Memory

S

SA
Acronym: System Administrator

SAM
Acronym: System Administrator Manager

SAMA
Acronym: Scientific Apparatus Makers Association

SC
Acronym: Signal Common

SCL
Acronym: Session Command Language

SCSI
Acronym: Small Computer System Interface

SDF
Acronym: Statistical Data File

SDLC
Acronym: Synchronous Data Link Communication

SEC
Abbreviation: Secondary

SEL
Abbreviation: Select or Selector

servo
Abbreviation: Servomotor

SES
Abbreviation: Smart Error State

SFDC
Abbreviation: Standard Format Operator's Console

SGP
Acronym: Shield Ground Point

SIA
Acronym: Serial Interface Assembly

SIMO
Acronym: Single-input, Multi-output

SISO
Acronym: Single-Input, Single-Output

SIU
Acronym: Serial Interface Unit

SMIN
Abbreviation: Smart Input

SMOUT
Abbreviation: Smart Output

SMT HIGH
Acronym: Smart Variable High Range

SMT LOW
Acronym: Smart Variable Low Range

SMT UNIT
Acronym: Smart Variable Units

SMT VAL
Acronym: Smart Variable Values

SP
Acronym: Setpoint

SPC
Acronym: Statistical Process Control

SPLX
Abbreviation: SImplex

SQC
Acronym: Statistical Quality Control

SQL
Abbreviation: Structured Query Language.

SQRT
Abbreviation: Square Root

SQX
Acronym: Statistical Quality Control

SR90
Abbreviation: 20-series (SR90) Controller Family

SSDA
Acronym: Synchronous Serial Data Adapter

ST
Abbreviation: Station

STA
Abbreviation: Station

STAT
Abbreviation: Station, or Status

STBY
Abbreviation: Standby

STI
Acronym: Smart Transmitter Interface

SUP or SUPV
Abbreviation: Supervisory Mode

SV
Acronym: Secondary Variable

SVA
Acronym: Signal Value Analog

SVD
Acronym: Signal Value Discrete

SVP
Acronym: Signal Value Percent

SVXFR
Acronym: Service Transfer

SW
Abbreviation: Switch, or Software

T

TC
Abbreviation: Thermocouple

TCALHI
Acronym: Transmitter Calibration High

TCALLO
Acronym: Transmitter Calibration Low

TCP/IP
Acronym: Transmission Control Protocol/Internet Protocol

TEU
Acronym: Transmitter Engineering Units

TI
Acronym: Texas Instruments, Incorporated

TIM
Abbreviation: Timer

.trn file
Acronym: Training file.

TPO
Acronym: Time Proportional Output

TTL
Acronym: Transistor-Transistor Logic

U

UAF
Acronym: User Authorization File

UART
Acronym: Universal Asynchronous Receiver/Transmitter

UCL
Acronym: Upper Control Limits

UCX
Acronym: DEC TCP/IP Services for OpenVMS VAX

UDC
Acronym: Unsolicited Data Control

UDF
Acronym: microPROVOX™ Display Format

UDK
Acronym: User-Defined Key

UIC
Acronym: User Identification Code

UL
Acronym: Underwriters Laboratories

UOC
Acronym: Unit Operations Controller

UOC+
Acronym: Unit Operations Controller+

UOC-DI
Acronym: Unit Operations Controller Discrete Input

UOC-DO
Acronym: Unit Operations Controller Discrete Output

UPS
Acronym: Uninterruptible Power Supply

URG
Abbreviation: Urgent

UVROM
Acronym: Ultraviolet Read-Only Memory or Ultraviolet Light Erasable ROM

V

VAX
Acronym: Virtual Access eXtension.

VCIA
Acronym: VME Communications Interface Assembly

VDU
Acronym: Video Display Unit

VGA
Acronym: Video Graphics Array

VME-bus
Acronym: Versa Module Eurocard Bus

VMS
Acronym: Virtual Memory System

VO
Acronym: Valve Output or Voltage Output

VOT
Acronym: Valve Output Tracking

VRCIA II
Acronym: VME Redundant Communications Interface Assembly

VSB
Acronym: VME Subsystem Bus

W

WAN
Acronym: Wide Area Network

WARN
Abbreviation: Warning

WDT
Acronym: Watchdog Timer

WPCON
Acronym: Workplace Console. See *Operator Workplace*.

WSI
Acronym: Weigh Scale Interface

X

XFR
Abbreviation: Transfer

XMIT
Symbol: Transmit

XMTR
Abbreviation: Transmitter

XOR
Acronym: Exclusive OR

Appendix A

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A

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Index

Symbols

A

B

C

D

E

F

G

H

I

J

K

L

M

N

O

P

Q

R

S

T

U

V

W

X

Z

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