

IEEE Standard for Parametric Data Log Format

Sponsor

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Abstract: A language and file format for describing parametric test data is defined. Data types, data formats, and file formats are included.

Keywords: data type, file structure, parametric data log, parametric test data

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Introduction

(This introduction is not part of IEEE Std 1545-1999, IEEE Standard for Parametric Data Log Format.)

The original Parametric Test Data Format (PTDF) was developed in the early 1990s as a data log file and transport format in a complex electronic test application area. As such, it was designed to be self-contained, not requiring any external data to define the data structure and content. The parameters recorded and reported covered a wide frequency range, and the PTDF files were transferred to a common data repository for analysis and tracking. Both specific test reports and statistical process control computations were done with this data. As the format evolved through 1997, more complex parameter groups and lists were handled. Since 1997, the PTDF has been used as a primary loader format for a test data warehouse. The PTDF has proven to be an effective and economical way to record and transport parametric data within a complex production test area.

Anticipated users of the Standard for Parametric Data Log Format include:

- Unit under test (UUT) developers;
- UUT maintainers;
- Test program set developers;
- Test program set maintainers;
- Automatic Test Equipment (ATE) system developers;
- ATE system maintainers;
- Test instrument developers;
- Developers of prime mission equipment that use the supported UUT as a component.

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IEEE Standard for Parametric Data Log Format

1. Overview

The objective of this standard is to define a format for parametric test data that is precise, readable, and understandable, and to promote the use of the data in support of continuous improvement. Common test data file formats allow and promote the use of analytical software.

In order for this standard to meet this objective, it must provide a method to convey information between producer and consumer. The primary goal of this standard is the definition of a data format with the following features:

- a) *Precision.* The language preserves both the precision of the data and the conditions under which the data was taken.
- b) *Sufficiency.* The test data file contains enough information to allow use of the data without ambiguity.
- c) *Flexibility.* The language is general enough to allow data exchange without exceptions or extensions.
- d) *Readability.* The language is readable by humans.
- e) *Transportability.* The language is transportable between computers; it should use standard ASCII characters and be insensitive to case.

A secondary goal is that the resulting data files be efficient in terms of storage requirement and processing speed. In order to maximize the usefulness of the data, the standard should strive to meet the following objectives:

- *Databases.* Allow ease of populating databases for analysis and archiving.
- *Vendor software.* Leverage the use of vendor software for databases and analysis.
- *Other system interfaces.* Promote the transfer of test data to existing manufacturing and quality systems.
- *Networking.* Support access to test data through networks.

1.1 Scope

This document defines a language and file format for describing parametric test data. The language is called Parametric Data Log (PDL) language.

The following information is within the scope:

- Data types;
- Data formats;
- File formats.

The following information is not within the scope:

- Definition of database formats;
- Definition of transfer methods;
- Information processing.

1.2 Purpose

The purpose of this standard is to establish a common method for describing parametric test data that can be used to facilitate the transfer of information between producers and users of the data.

1.3 Intended use

This standard shall be used to

- a) Allow transfer of existing test information;
- b) Facilitate the loading of databases;
- c) Provide a common interface to general-use data analysis application programs;
- d) Provide a model for data files to be implemented in the design of future automated test systems.

2. References

This standard shall be used in conjunction with the following publications. When the following standards are superseded by an approved revision, the revision should be considered for incorporation into this standard.

ANSI/IEEE Std 260.1-1993, American National Standard Letter Symbols for Units of Measurement (SI Units, Customary Inch-Pound Units, and Certain Other Units).¹

IEEE Std 100-1996, IEEE Standard Dictionary of Electrical and Electronics Terms.²

IEEE Std 945-1984, IEEE Recommended Practice for Preferred Metric Units for Use in Electrical and Electronics Science and Technology.

¹ANSI publications are available from the Sales Department, American National Standards Institute, 11 West 42nd Street, 13th Floor, New York, NY 10036, USA (<http://www.ansi.org/>).

²IEEE publications are available from the Institute of Electrical and Electronics Engineers, 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331, USA (<http://www.standards.ieee.org/>).

3. Definitions

For the purpose of this standard, the following terms and definitions apply. The terms defined in this clause are specified herein to support readability and clarity of this standard. In the event a term is explicitly re-defined, or further defined, in a component standard, the component standard's definition shall be normative for that component standard.

3.1 identifiers: Names assigned to each of the unique parametric data elements in the data file. They cannot be the same as any Parametric Data Log (PDL) reserved words. These names can be created from any combination of characters with a few exceptions:

- a) The space character (i.e., ASCII code 32) may not be used unless enclosed in double quotes. (Refer to 5.2.1 for more information on the valid character set.)
- b) They shall be unique within the file.

3.2 parametric test data: The values of the observed or measured electrical or physical properties of a unit under test (UUT) that may be used to determine its characteristics or its conformance to requirements.

3.3 test event: An action or group of actions performed on a particular unit under test (UUT) to evaluate a parameter or characteristic. It is the process of initialization, stimulus, and measurement of the UUT. It includes one or more tests and occurs during a continuous period of time. Test events are defined by the test procedure or test software requirements. A Parametric Data Log (PDL) file corresponds to a single event and would be a test of a single device or unit.

3.4 test event data: The necessary and sufficient set of information that allows the parametric data to be understood in the context within which it was obtained. It includes the identification of the unit under test (UUT), test set hardware and procedure, the start time and stop time when the data was taken, and any other information needed to interpret the parametric data.

4. Conformance requirements

Files claiming conformance to this standard shall conform to all required clauses of the standard. Files that implement the optional parts of the standard shall comply with the format of those optional parts.

5. System functions and characteristics

The PDL format standard consists of two parts: the PDL language definition and the parametric data logging exchange file requirements. The following clauses define the basic language elements and data types as well as the PDL file structure.

5.1 Document conventions

The conventions shown in Table 1 are used throughout this document.

5.2 Basic language elements

The PDL language elements consist of the character set, symbols, reserved words, named data, and comments. The basic language elements are composed into a stream of text that is broken into statements. Statements may be of any length.

Table 1—Document conventions

Sample	Meaning
DEFINE_DATA	Text in all capital letters and the same font as the document identifies PDL language reserved word.
DEFINE_DATA	Text in a fixed-width font denotes computer text and examples.
<identifier>	Italic text within angle braces is used to denote a user-supplied data field.

5.2.1 ASCII character set

Test data files written in PDL language may use all printable ASCII characters (i.e., character codes 32 through 126) with the following exceptions:

- Some of the printable ASCII characters have predefined meanings and cannot be used in identifiers or data descriptions unless enclosed in quotation marks.
- ASCII carriage return and line feed characters may be used in any location where a space character is allowed for clarity of text. These characters do not alter the meaning or content of the file.

The case of letters is significant only in explicit string literals.

5.2.2 Symbols

Symbols are the characters that have special meaning in PDL language. Symbols are used as delimiters and operators. A delimiter is used to separate or end elements in PDL language. Operators denote that a relationship exists between elements. One or more space characters can be used to separate elements in order to improve the structure and readability of the written language. As an option, quotes can be used to surround <identifiers> to allow embedded white space and symbols, or around <descriptions> and <string data> to allow embedded symbols. The PDL language symbols are shown in Table 2.

5.2.3 Reserved words

Reserved words in PDL language are the names of keywords and certain constants, dimensions, and units.

5.2.3.1 Constants

The following constants are reserved words:

PASS
FAIL
TRUE
FALSE
UNKNOWN
NONE

Table 2—PDL language symbols

Symbol	ASCII code	Allowable in:		Function
		Identifiers	Descriptions	
Parentheses “(” “)”	40, 41	Yes	Yes	Group and array data separators
Comma “,”	44	No	No	Field separator
Decimal point “.”	46	Yes	Yes	Decimal point in real numbers
Semicolon “;”	59	No	No	Statement terminator
Colon “:”	58	Yes	Yes	Delineator in TIME format strings
Equal sign “=”	61	No	No	Field separator
Slash asterisk “/*”	47, 42	Yes	Yes	Start of comment delimiter
Asterisk slash “*/”	42, 47	Yes	Yes	End of comment delimiter
Double quotes “ ”	34	Yes	Yes	Enclose symbols used in strings

5.2.3.2 Unit prefixes

The International System (SI) prefixes in Table 3, as defined in IEEE Std 945-1984³, are reserved words. The prefixes are used with the primary quantity units to define the unit of measure:

Table 3—International System (SI) prefixes

Prefix	Multiplier	Prefix	Multiplier
EXA	10^{18}	DECI	10^{-1}
PETA	10^{15}	CENTI	10^{-2}
TERA	10^{12}	MILLI	10^{-3}
GIGA	10^9	MICRO	10^{-6}
MEGA	10^6	NANO	10^{-9}
KILO	10^3	PICO	10^{-12}
HECTO	10^2	FEMTO	10^{-15}
DEKA	10^1	ATTO	10^{-18}

³Information on references can be found in Clause 2.