

Merlin Open Systems - Statement of Year 2000 Conformity

Introduction

“Problems can arise from some means of representing dates in computer equipment and products and from date-logic embedded in purchased goods or services, as the year 2000 approaches and during and after that year. As a result, equipment or products, including embedded control logic, may fail completely, malfunction or cause data to be corrupted”. (**DISC PD2000-1:1998** *A Definition of Year 2000 Conformity Requirements*).

This document addresses how Merlin Open Systems is tackling Year 2000 conformity. For definitions of the problem please see the attached document (**DISC PD2000-1:1998** *A Definition of Year 2000 Conformity Requirements*).

In brief: “Year 2000 conformity shall mean that neither performance nor functionality is affected by dates prior to, during and after the year 2000.”

Year 2000 and Merlin Open Systems

The Year 2000 issues for Merlin Open Systems can be viewed in three areas:

Hardware

Merlin Open Systems are affected by Year 2000 issues as users of computer equipment. Merlin Open Systems are upgrading / renewing machines to bring hardware up to Year 2000 compliance. This will be complete by June 30th 1999.

Software

Merlin Open Systems are affected by Year 2000 issues as users of computer software. Merlin Open Systems are/have upgraded to the latest versions of operating systems (Windows 95/98) to avoid operating system issues. Year 2000 compliant development environments are used. The only proviso to this is the development of code for non-year 2000 systems such as Windows 3.x.

Products

Merlin Open Systems are affected by Year 2000 issues as developers of computer software. Merlin Open Systems code does handle dates usually via operating system calls. In compliant operating systems Merlin Open Systems date code will function as specified by the operating system.

Merlin Open Systems applies the Year 2000 conformance rules in its code:

- 1 – No date values cause interruption in the program,
- 2 – Date-based functionality is consistent for dates up to and beyond the year 2000,
- 3 – In interfaces and data storage the century is either stored explicitly or by unambiguous rules,
- 4 – The year 2000 is recognised as a leap year.

Reference

DISC PD2000-1:1998 *A Definition of Year 2000 Conformity Requirements*. British Standards Institute 1998.



A DEFINITION OF YEAR 2000 CONFORMITY REQUIREMENTS

Preamble to the Summer 1998 amendment

BSI DISC originally published PD2000-1 in January 1997 and it has been widely adopted. A review of the document was conducted by the responsible committee (BDD/1/3) in the spring of 1998 taking into account comments received. The committee considered that amendments to the fundamental conformity requirements were neither necessary nor desirable. The Definition and the four Rules are unchanged but, to add value to the document and aid its interpretation, the Amplification sections have been amended. This document, PD2000-1:1998, replaces the previous version of PD2000-1 but does not change its requirements. An additional document PD2000-4, entitled "PD2000-1 in Action" will provide further information on PD2000-1:1998 together with information on its use.

Paragraph numbers have been enhanced in the Amplification section to aid referencing and substantial revisions to the document are indicated by side lines against the changed text.

Introduction

This document addresses what is commonly known as Year 2000 conformity (also sometimes known as century or millennium compliance). It provides a definition of this expression and requirements that must be satisfied in equipment and products which use dates and times.

It has been prepared by British Standards Institution committee BDD/1/3 in response to demand from UK industry, commerce and the public sector. It is the result of work from the following bodies whose contributions are gratefully acknowledged: BT, Cap Gemini, CCTA, PricewaterhouseCoopers, Halberstam Elias, ICL, National Health Service, National Westminster Bank. Additionally, BSI DISC acknowledges the support of the Electronics and Information Industries Forum (EIIF), Action 2000, Taskforce 2000 and Digital Equipment as well as the original bodies for their participation in the review of this document.

BSI DISC would also like to thank the following organizations for their support and encouragement in the development of this definition: Barclays Bank, British Airways, Cambridgeshire County Council, Computer Software Services Association, Department of Health, Ernst & Young, Federation of Small Businesses, IBM, ICL, National Power, Paymaster Agency, Prudential Assurance, Reuters, Tesco Stores.

While every care has been taken in developing this document, the contributing organizations accept no liability for any loss or damage caused, arising directly or indirectly, in connection with reliance on its contents except to the extent that such liability may not be excluded at law. Independent legal advice should be sought by any person or organization intending to enter into a contractual commitment relating to Year 2000 conformity requirements.

This entire document or the Definition section (including the four Rules) may be freely copied provided that the text is reproduced in full, the source acknowledged and the reference number of this document is quoted. It is recommended that the Amplification section be included. References to "PD2000-1:1998" shall be interpreted as meaning the entire document.

THE DEFINITION

Year 2000 conformity shall mean that neither performance nor functionality is affected by dates prior to, during and after the year 2000.

In particular:

- Rule 1** No value for current date will cause any interruption in operation.
- Rule 2** Date-based functionality must behave consistently for dates prior to, during and after year 2000.
- Rule 3** In all interfaces and data storage, the century in any date must be specified either explicitly or by unambiguous algorithms or inferencing rules.
- Rule 4** Year 2000 must be recognized as a leap year.



AMPLIFICATION OF THE DEFINITION AND RULES

1 General Explanation

1.1 Problems can arise from some means of representing dates in computer equipment and products and from date-logic embedded in purchased goods or services, as the year 2000 approaches and during and after that year. As a result, equipment or products, including embedded control logic, may fail completely, malfunction or cause data to be corrupted.

1.2 To avoid such problems, organizations must check, and modify if necessary, internally produced equipment and products and similarly check externally supplied equipment and products with their suppliers. The purpose of this document is to allow such checks to be made on a basis of common understanding.

1.3 Where checks are made with external suppliers, care should be taken to distinguish between claims of conformity and the ability to demonstrate conformity.

2 Amplification of the definition

2.1 PD2000-1 (all editions) is solely concerned with the performance and functionality of a single version, release or system. It does not address differences in performance or functionality between different versions, releases or systems.

2.2 Variations in performance immeasurably small in the context of use do not make a version, release or system non-conformant.

3 Amplification of the Rules

3.1 Rule 1

3.1.1 This rule is sometimes known as *general integrity*.

3.1.2 If this requirement is satisfied, roll-over between all significant time demarcations (e.g. days, months, years, centuries) will be performed correctly.

3.1.3 *Current date* means today's date as known to the equipment or product, i.e. the actual date of operation [NOTE - this refers to normal operation and does not prevent testing.]

3.2 Rule 2

3.2.1 This rule is sometimes known as *date integrity*.

3.2.2 This rule means that all equipment and products must calculate, manipulate and represent dates correctly for the purposes for which they were intended.

3.2.3 The meaning of *functionality* includes both processes and the results of those processes.

3.2.4 If desired, a reference point for date values and calculations may be added by organizations; e.g. as defined by the Gregorian calendar.

3.2.5 No equipment or product shall use particular date values for special meanings; e.g. "99" to signify "no end value" or "end of file" or "00" to mean "not applicable" or "beginning of file" unless the values in question lie outside its possible date range.

3.3 Rule 3

3.3.1 This rule is sometimes known as *explicit/implicit century*.

3.3.2 It covers two general approaches:

(a) **explicit representation of the year in dates:** e.g. by using four digits or by including a century indicator. In this case, a reference may be inserted (e.g. 4-digit years as allowed by ISO 8601:1988) and it may be necessary to allow for exceptions where domain-specific standards (e.g. standards relating to Electronic Data Interchange, Automatic Teller Machines or Bankers Automated Clearing Services) should have precedence.

(b) **the use of inferencing rules:** e.g. two-digit years with a value greater than 50 imply 19xx, those with a value equal to or less than 50 imply 20xx. Rules for century inferencing as a whole must apply to all contexts in which the date is used, although different inferencing rules may apply to different date sets. Where any date element is represented without a century, the correct century shall be unambiguous for all manipulations involving that element.

3.4 Rule 4

3.4.1 A leap year is defined in ISO 8601:1988 (amended in 1991) as follows:

"year, leap: In the Gregorian calendar, a year which has 366 days. A leap year is a year whose number is divisible by four an integral number of times, except that if it is a centennial year it shall be divisible by four hundred an integral number of times."

3.4.2 Thus, for example, 2000 is a leap year but 1900 is not.

4 General Notes

4.1 For Rules 1 and 2 in particular, it is recommended that the allowable ranges for values of current date and dates to be manipulated be documented, recognizing that all systems have some limitation on the valid date ranges. The ranges may relate to one or more of the feasible life-spans of equipment or products or the span of dates required to be represented by the organization's business processes.

4.2 Tests for specifically critical dates may also be added (e.g. for leap years, end of year, etc.). Organizations may wish to append additional material in support of local requirements.

4.3 Where the term "century" is used, clear distinction should be made between the "value" denoting the century (e.g. 20th) and its representation in dates (e.g. 19xx); similarly, 21st and 20xx.

