

# **Linux Standard Base Core Specification for PPC32 3.0**

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## Foreword

This is version 3.0 of the Linux Standard Base Core Specification for PPC32. This specification is part of a family of specifications under the general title "Linux Standard Base". Developers of applications or implementations interested in using the LSB trademark should see the Free Standards Group Certification Policy for details.

## Introduction

The LSB defines a binary interface for application programs that are compiled and packaged for LSB-conforming implementations on many different hardware architectures. Since a binary specification shall include information specific to the computer processor architecture for which it is intended, it is not possible for a single document to specify the interface for all possible LSB-conforming implementations. Therefore, the LSB is a family of specifications, rather than a single one.

This document should be used in conjunction with the documents it references. This document enumerates the system components it includes, but descriptions of those components may be included entirely or partly in this document, partly in other documents, or entirely in other reference documents. For example, the section that describes system service routines includes a list of the system routines supported in this interface, formal declarations of the data structures they use that are visible to applications, and a pointer to the underlying referenced specification for information about the syntax and semantics of each call. Only those routines not described in standards referenced by this document, or extensions to those standards, are described in the detail. Information referenced in this way is as much a part of this document as is the information explicitly included here.

The specification carries a version number of either the form  $x.y$  or  $x.y.z$ . This version number carries the following meaning:

- The first number ( $x$ ) is the major version number. All versions with the same major version number should share binary compatibility. Any addition or deletion of a new library results in a new version number. Interfaces marked as `deprecated` may be removed from the specification at a major version change.
- The second number ( $y$ ) is the minor version number. Individual interfaces may be added if all certified implementations already had that (previously undocumented) interface. Interfaces may be marked as `deprecated` at a minor version change. Other minor changes may be permitted at the discretion of the LSB workgroup.
- The third number ( $z$ ), if present, is the editorial level. Only editorial changes should be included in such versions.

# 1 Scope

## 1.1 General

The Linux Standard Base (LSB) defines a system interface for compiled applications and a minimal environment for support of installation scripts. Its purpose is to enable a uniform industry standard environment for high-volume applications conforming to the LSB.

These specifications are composed of two basic parts: A common specification ("LSB-generic") describing those parts of the interface that remain constant across all implementations of the LSB, and an architecture-specific specification ("LSB-arch") describing the parts of the interface that vary by processor architecture. Together, the LSB-generic and the architecture-specific supplement for a single hardware architecture provide a complete interface specification for compiled application programs on systems that share a common hardware architecture.

The LSB-generic document shall be used in conjunction with an architecture-specific supplement. Whenever a section of the LSB-generic specification shall be supplemented by architecture-specific information, the LSB-generic document includes a reference to the architecture supplement. Architecture supplements may also contain additional information that is not referenced in the LSB-generic document.

The LSB contains both a set of Application Program Interfaces (APIs) and Application Binary Interfaces (ABIs). APIs may appear in the source code of portable applications, while the compiled binary of that application may use the larger set of ABIs. A conforming implementation shall provide all of the ABIs listed here. The compilation system may replace (e.g. by macro definition) certain APIs with calls to one or more of the underlying binary interfaces, and may insert calls to binary interfaces as needed.

The LSB is primarily a binary interface definition. Not all of the source level APIs available to applications may be contained in this specification.

## 1.2 Module Specific Scope

This is the PPC32 architecture specific Core module of the Linux Standards Base (LSB). This module supplements the generic LSB Core module with those interfaces that differ between architectures.

Interfaces described in this module are mandatory except where explicitly listed otherwise. Core interfaces may be supplemented by other modules; all modules are built upon the core.



## 2 Normative References

The specifications listed below are referenced in whole or in part by the Linux Standard Base. In this specification, where only a particular section of one of these references is identified, then the normative reference is to that section alone, and the rest of the referenced document is informative.

**Table 2-1 Normative References**

| <b>Name</b>  | <b>Title</b>   | <b>URL</b>  |
|--|--|---|
| DWARF Debugging Information Format, Revision 2.0.0         | DWARF Debugging Information Format, Revision 2.0.0 (July 27, 1993)   | <a href="http://refspecs.freestandards.org/dwarf/dwarf-2.0.0.pdf">http://refspecs.freestandards.org/dwarf/dwarf-2.0.0.pdf</a> |
| DWARF Debugging Information Format, Revision 3.0.0 (Draft) | DWARF Debugging Information Format, Revision 3.0.0 (Draft)   | <a href="http://refspecs.freestandards.org/dwarf/">http://refspecs.freestandards.org/dwarf/</a>                               |
| Filesystem Hierarchy Standard                              | Filesystem Hierarchy Standard (FHS) 2.3  | <a href="http://www.pathname.com/fhs/">http://www.pathname.com/fhs/</a>   |
| IEC 559/IEEE 754 Floating Point                            | IEC 559:1989 Binary floating-point arithmetic for microprocessor systems   | <a href="http://www.ieee.org/">http://www.ieee.org/</a>   |
| ISO C (1999)   | ISO/IEC 9899: 1999, Programming Languages --C  |   |
| ISO POSIX (2003)   | <p>ISO/IEC 9945-1:2003<br/>Information technology -<br/>- Portable Operating System Interface (POSIX)<br/>-- Part 1: Base Definitions</p> <p>ISO/IEC 9945-2:2003<br/>Information technology -<br/>- Portable Operating System Interface (POSIX)<br/>-- Part 2: System Interfaces</p> <p>ISO/IEC 9945-3:2003<br/>Information technology -<br/>- Portable Operating System Interface (POSIX)<br/>-- Part 3: Shell and Utilities</p> <p>ISO/IEC 9945-4:2003<br/>Information technology -<br/>- Portable Operating System Interface (POSIX)<br/>-- Part 4: Rationale</p> | <a href="http://www.unix.org/version3/">http://www.unix.org/version3/</a>   |

2 Normative References

| Name   | Title  | URL   |
|--|--|---|
|  | Including Technical Cor. 1: 2004   |   |
| ISO/IEC TR14652  | ISO/IEC Technical Report 14652:2002 Specification method for cultural conventions  |   |
| ITU-T V.42   | International Telecommunication Union Recommendation V.42 (2002): Error-correcting procedures for DCEs using asynchronous-to-synchronous conversion ITUV | <a href="http://www.itu.int/rec/recommendation.asp?type=folders&amp;lang=e&amp;parent=T-REC-V.42">http://www.itu.int/rec/recommendation.asp?type=folders&amp;lang=e&amp;parent=T-REC-V.42</a> |
| Large File Support                                     | Large File Support   | <a href="http://www.UNIX-systems.org/version2/whatsnew/lfs20mar.html">http://www.UNIX-systems.org/version2/whatsnew/lfs20mar.html</a>   |
| Li18nux Globalization Specification                    | LI18NUNIX 2000 Globalization Specification, Version 1.0 with Amendment 4   | <a href="http://www.li18nux.org/docs/html/LI18NUNIX-2000-amd4.htm">http://www.li18nux.org/docs/html/LI18NUNIX-2000-amd4.htm</a>   |
| Linux Allocated Device Registry                        | LINUX ALLOCATED DEVICES  | <a href="http://www.lanana.org/docs/device-list/devices.txt">http://www.lanana.org/docs/device-list/devices.txt</a>   |
| PAM  | Open Software Foundation, Request For Comments: 86.0 , October 1995, V. Samar & R.Schemers (SunSoft)   | <a href="http://www.opengroup.org/tech/rfc/mirror-rfc/rfc86.0.txt">http://www.opengroup.org/tech/rfc/mirror-rfc/rfc86.0.txt</a>   |
| RFC 1321: The MD5 Message-Digest Algorithm             | IETF RFC 1321: The MD5 Message-Digest Algorithm  | <a href="http://www.ietf.org/rfc/rfc1321.txt">http://www.ietf.org/rfc/rfc1321.txt</a>   |
| RFC 1833: Binding Protocols for ONC RPC Version 2      | IETF RFC 1833: Binding Protocols for ONC RPC Version 2   | <a href="http://www.ietf.org/rfc/rfc1833.txt">http://www.ietf.org/rfc/rfc1833.txt</a>   |
| RFC 1950: ZLIB Compressed Data Format Specification    | IETF RFC 1950: ZLIB Compressed Data Format Specification   | <a href="http://www.ietf.org/rfc/rfc1950.txt">http://www.ietf.org/rfc/rfc1950.txt</a>   |
| RFC 1951: DEFLATE Compressed Data Format Specification | IETF RFC 1951: DEFLATE Compressed Data Format Specification version 1.3  | <a href="http://www.ietf.org/rfc/rfc1951.txt">http://www.ietf.org/rfc/rfc1951.txt</a>   |
| RFC 1952: GZIP File                                    | IETF RFC 1952: GZIP file   | <a href="http://www.ietf.org/rfc">http://www.ietf.org/rfc</a>   |

| <b>Name</b>  | <b>Title</b>  | <b>URL</b>  |
|--|---|---|
| Format Specification   | format specification version 4.3  | /rfc1952.txt  |
| RFC 2440: OpenPGP Message Format                                   | IETF RFC 2440: OpenPGP Message Format   | <a href="http://www.ietf.org/rfc/rfc2440.txt">http://www.ietf.org/rfc/rfc2440.txt</a>   |
| RFC 2821:Simple Mail Transfer Protocol                             | IETF RFC 2821: Simple Mail Transfer Protocol  | <a href="http://www.ietf.org/rfc/rfc2821.txt">http://www.ietf.org/rfc/rfc2821.txt</a>   |
| RFC 2822:Internet Message Format                                   | IETF RFC 2822: Internet Message Format  | <a href="http://www.ietf.org/rfc/rfc2822.txt">http://www.ietf.org/rfc/rfc2822.txt</a>   |
| RFC 791:Internet Protocol  | IETF RFC 791: Internet Protocol Specification   | <a href="http://www.ietf.org/rfc/rfc791.txt">http://www.ietf.org/rfc/rfc791.txt</a>   |
| SUSv2  | CAE Specification, January 1997, System Interfaces and Headers (XSH),Issue 5 (ISBN: 1-85912-181-0, C606)                              | <a href="http://www.opengroup.org/publications/catalog/un.htm">http://www.opengroup.org/publications/catalog/un.htm</a>                       |
| SUSv2 Commands and Utilities                                       | The Single UNIX® Specification(SUS) Version 2, Commands and Utilities (XCU), Issue 5 (ISBN: 1-85912-191-8, C604)                      | <a href="http://www.opengroup.org/publications/catalog/un.htm">http://www.opengroup.org/publications/catalog/un.htm</a>                       |
| SVID Issue 3   | American Telephone and Telegraph Company, System V Interface Definition, Issue 3 ; Morristown, NJ, UNIX Press, 1989.(ISBN 0201566524) |   |
| SVID Issue 4   | System V Interface Definition,Fourth Edition  |   |
| System V ABI   | System V Application Binary Interface, Edition 4.1  | <a href="http://www.caldera.com/developers/devspecs/gabi41.pdf">http://www.caldera.com/developers/devspecs/gabi41.pdf</a>                     |
| System V ABI Update  | System V Application Binary Interface - DRAFT - 17 December 2003  | <a href="http://www.caldera.com/developers/gabi/2003-12-17/contents.html">http://www.caldera.com/developers/gabi/2003-12-17/contents.html</a> |
| System V Application Binary Interface PowerPC Processor Supplement | System V Application Binary Interface PowerPC Processor Supplement  | <a href="http://refspecs.freestandards.org/elf/elfspec_ppc.pdf">http://refspecs.freestandards.org/elf/elfspec_ppc.pdf</a>                     |
| The PowerPC™ Microprocessor Family                                 | The PowerPC™ Microprocessor Family: The Programming   | <a href="http://refspecs.freestandards.org/PPC_hrm.2005mar31.pdf">http://refspecs.freestandards.org/PPC_hrm.2005mar31.pdf</a>                 |

## 2 Normative References

| Name               | Title   | URL   |
|--------------------|---|---|
|                    | Environment Manual for<br>32 and 64-bit<br>Microprocessors  |   |
| this specification | Linux Standard Base   | <a href="http://www.linuxbase.org/spec/">http://www.linuxbase.org/spec/</a>   |
| X/Open Curses      | CAE Specification, May<br>1996, X/Open Curses,<br>Issue 4, Version 2 (ISBN:<br>1-85912-171-3, C610),<br>plus Corrigendum U018 | <a href="http://www.opengroup.org/publications/catalog/un.htm">http://www.opengroup.org/publications/catalog/un.htm</a> |

## 3 Requirements

### 3.1 Relevant Libraries

The libraries listed in Table 3-1 shall be available on PPC32 Linux Standard Base systems, with the specified runtime names. These names override or supplement the names specified in the generic LSB specification. The specified program interpreter, referred to as `proginterp` in this table, shall be used to load the shared libraries specified by `DT_NEEDED` entries at run time.

**Table 3-1 Standard Library Names**

| Library    | Runtime Name           |
|------------|------------------------|
| libm       | libm.so.6              |
| libdl      | libdl.so.2             |
| libcrypt   | libcrypt.so.1          |
| libz       | libz.so.1              |
| libncurses | libncurses.so.5        |
| libutil    | libutil.so.1           |
| libc       | libc.so.6              |
| libpthread | libpthread.so.0        |
| proginterp | /lib/ld-lsb-ppc32.so.3 |
| libgcc_s   | libgcc_s.so.1          |

These libraries will be in an implementation-defined directory which the dynamic linker shall search by default.

### 3.2 LSB Implementation Conformance

A conforming implementation shall satisfy the following requirements:

- The implementation shall implement fully the architecture described in the hardware manual for the target processor architecture.
- The implementation shall be capable of executing compiled applications having the format and using the system interfaces described in this document.
- The implementation shall provide libraries containing the interfaces specified by this document, and shall provide a dynamic linking mechanism that allows these interfaces to be attached to applications at runtime. All the interfaces shall behave as specified in this document.
- The map of virtual memory provided by the implementation shall conform to the requirements of this document.
- The implementation's low-level behavior with respect to function call linkage, system traps, signals, and other such activities shall conform to the formats described in this document.
- The implementation shall provide all of the mandatory interfaces in their entirety.

- The implementation may provide one or more of the optional interfaces. Each optional interface that is provided shall be provided in its entirety. The product documentation shall state which optional interfaces are provided.
- The implementation shall provide all files and utilities specified as part of this document in the format defined here and in other referenced documents. All commands and utilities shall behave as required by this document. The implementation shall also provide all mandatory components of an application's runtime environment that are included or referenced in this document.
- The implementation, when provided with standard data formats and values at a named interface, shall provide the behavior defined for those values and data formats at that interface. However, a conforming implementation may consist of components which are separately packaged and/or sold. For example, a vendor of a conforming implementation might sell the hardware, operating system, and windowing system as separately packaged items.
- The implementation may provide additional interfaces with different names. It may also provide additional behavior corresponding to data values outside the standard ranges, for standard named interfaces.

### 3.3 LSB Application Conformance

A conforming application shall satisfy the following requirements:

- Its executable files are either shell scripts or object files in the format defined for the Object File Format system interface.
- Its object files participate in dynamic linking as defined in the Program Loading and Linking System interface.
- It employs only the instructions, traps, and other low-level facilities defined in the Low-Level System interface as being for use by applications.
- If it requires any optional interface defined in this document in order to be installed or to execute successfully, the requirement for that optional interface is stated in the application's documentation.
- It does not use any interface or data format that is not required to be provided by a conforming implementation, unless:
  - If such an interface or data format is supplied by another application through direct invocation of that application during execution, that application is in turn an LSB conforming application.
  - The use of that interface or data format, as well as its source, is identified in the documentation of the application.
- It shall not use any values for a named interface that are reserved for vendor extensions.

A strictly conforming application does not require or use any interface, facility, or implementation-defined extension that is not defined in this document in order to be installed or to execute successfully.

## 4 Definitions

For the purposes of this document, the following definitions, as specified in the *ISO/IEC Directives, Part 2, 2001, 4th Edition*, apply:

can

be able to; there is a possibility of; it is possible to

cannot

be unable to; there is no possibility of; it is not possible to

may

is permitted; is allowed; is permissible

need not

it is not required that; no...is required

shall

is to; is required to; it is required that; has to; only...is permitted; it is necessary

shall not

is not allowed [permitted] [acceptable] [permissible]; is required to be not; is required that...be not; is not to be

should

it is recommended that; ought to

should not

it is not recommended that; ought not to

## 5 Terminology

For the purposes of this document, the following terms apply:

### archLSB

The architectural part of the LSB Specification which describes the specific parts of the interface that are platform specific. The archLSB is complementary to the gLSB.

### Binary Standard

The total set of interfaces that are available to be used in the compiled binary code of a conforming application.

### gLSB

The common part of the LSB Specification that describes those parts of the interface that remain constant across all hardware implementations of the LSB.

### implementation-defined

Describes a value or behavior that is not defined by this document but is selected by an implementor. The value or behavior may vary among implementations that conform to this document. An application should not rely on the existence of the value or behavior. An application that relies on such a value or behavior cannot be assured to be portable across conforming implementations. The implementor shall document such a value or behavior so that it can be used correctly by an application.

### Shell Script

A file that is read by an interpreter (e.g., awk). The first line of the shell script includes a reference to its interpreter binary.

### Source Standard

The set of interfaces that are available to be used in the source code of a conforming application.

### undefined

Describes the nature of a value or behavior not defined by this document which results from use of an invalid program construct or invalid data input. The value or behavior may vary among implementations that conform to this document. An application should not rely on the existence or validity of the value or behavior. An application that relies on any particular value or behavior cannot be assured to be portable across conforming implementations.

### unspecified

Describes the nature of a value or behavior not specified by this document which results from use of a valid program construct or valid data input. The value or behavior may vary among implementations that conform to this document. An application should not rely on the existence or validity of the value or behavior. An application that relies on any particular value or behavior cannot be assured to be portable across conforming implementations.



Other terms and definitions used in this document shall have the same meaning as defined in Chapter 3 of the Base Definitions volume of ISO POSIX (2003).

## 6 Documentation Conventions

Throughout this document, the following typographic conventions are used:

`function()`

the name of a function

**command**

the name of a command or utility

CONSTANT

a constant value

*parameter*

a parameter

variable

a variable

Throughout this specification, several tables of interfaces are presented. Each entry in these tables has the following format:

name

the name of the interface

(symver)

An optional symbol version identifier, if required.

[*refno*]

A reference number indexing the table of referenced specifications that follows this table.

For example,

|                                     |
|-------------------------------------|
| <code>forkpty(GLIBC_2.0) [1]</code> |
|-------------------------------------|

refers to the interface named `forkpty()` with symbol version `GLIBC_2.0` that is defined in the first of the listed references below the table.

## 7 Introduction

Executable and Linking Format (ELF) defines the object format for compiled applications. This specification supplements the information found in System V ABI Update and System V Application Binary Interface PowerPC Processor Supplement, and is intended to document additions made since the publication of that document.

## 8 Low Level System Information

### 8.1 Machine Interface

#### 8.1.1 Processor Architecture

The PowerPC Architecture is specified by the following documents:

- System V Application Binary Interface PowerPC Processor Supplement
- The PowerPC™ Microprocessor Family

Only the features of the PowerPC 603 processor instruction set may be assumed to be present. An application should determine if any additional instruction set features are available before using those additional features. If a feature is not present, then the application may not use it.

**Note:** The presence of a hardware floating point unit is optional. However, applications requiring floating point arithmetic may experience substantial performance penalties on system without such a unit.

Only instructions which do not require elevated privileges may be used by the application.

Applications may not make system calls directly. The interfaces in the implementation base libraries must be used instead.

An implementation must support the 32-bit computation mode as described in The PowerPC™ Microprocessor Family. Conforming applications shall not use instructions provided only for the 64-bit mode.

Applications conforming to this specification must provide feedback to the user if a feature that is required for correct execution of the application is not present. Applications conforming to this specification should attempt to execute in a diminished capacity if a required feature is not present.

This specification does not provide any performance guarantees of a conforming system. A system conforming to this specification may be implemented in either hardware or software.

#### 8.1.2 Data Representation

LSB-conforming applications shall use the data representation as defined in Chapter 3 "Data Representation" section of the System V Application Binary Interface PowerPC Processor Supplement.

##### 8.1.2.1 Byte Ordering

LSB-conforming applications shall use big-endian byte ordering. LSB-conforming implementations may support little-endian applications.

##### 8.1.2.2 Fundamental Types

In addition to the fundamental types specified in Chapter 3 "Fundamental Types" section of the System V Application Binary Interface PowerPC Processor Supplement, a 64 bit data type is defined here.

Table 8-1 Scalar Types

| Type     | C                  | sizeof | Alignment (bytes) | Intell386 Architecture |
|----------|--------------------|--------|-------------------|------------------------|
| Integral | long long          | 8      | 8                 | signed double word     |
|          | signed long long   |        |                   |                        |
|          | unsigned long long | 8      | 8                 | unsigned double word   |

LSB-conforming applications shall not use the long double fundamental type.

## 8.2 Function Calling Sequence

LSB-conforming applications shall use the function calling sequence as defined in Chapter 3, Section "Function Calling Sequence" of the System V Application Binary Interface PowerPC Processor Supplement.

### 8.2.1 CPU Registers

LSB-conforming applications shall use only the registers described in Chapter 3, Section "Function Calling Sequence", Subsection "Registers" of the System V Application Binary Interface PowerPC Processor Supplement.

### 8.2.2 Floating Point Registers

LSB-conforming applications shall use only the registers described in Chapter 3, Section "Function Calling Sequence", Subsection "Registers" of the System V Application Binary Interface PowerPC Processor Supplement.

### 8.2.3 Stack Frame

LSB-conforming applications shall use stack frames as described in Chapter 3, Section "Function Calling Sequence", Subsection "The Stack Frame" of the System V Application Binary Interface PowerPC Processor Supplement.

### 8.2.4 Arguments

LSB-conforming applications shall pass parameters to functions as described in Chapter 3, Section "Function Calling Sequence", Subsection "Parameter Passing" of the System V Application Binary Interface PowerPC Processor Supplement.

### 8.2.5 Return Values

LSB-conforming applications shall not return structures or unions in registers as described in Chapter 3, Section "Function Calling Sequence", Subsection "Return Values" of System V Application Binary Interface PowerPC Processor Supplement. Instead they must use the alternative method of passing the address of a buffer in a register as shown in the same section.

## 8.3 Operating System Interface

LSB-conforming applications shall use the Operating System Interfaces as defined in Chapter 3, Section "Operating System Interface" of the System V Application Binary Interface PowerPC Processor Supplement.

### 8.3.1 Exception Interface

LSB-conforming applications shall use the Exception Interfaces as defined in Chapter 3, Section "Exception Interface" of the System V Application Binary Interface PowerPC Processor Supplement.

#### 8.3.1.1 Debugging Support

The LSB does not specify debugging information, however, if the DWARF specification is implemented, see Chapter 3, Section "DWARF Definition" of the System V Application Binary Interface PowerPC Processor Supplement.

### 8.3.2 Signal Delivery

LSB-conforming applications shall follow the guidelines defined in Chapter 3, Section "Exception Interface" of the System V Application Binary Interface PowerPC Processor Supplement.

## 8.4 Process Initialization

LSB-conforming applications shall use the Process initialization as defined in Chapter 3, Section "Process Initialization" of the System V Application Binary Interface PowerPC Processor Supplement.

### 8.4.1 Special Registers

Contrary to what is stated in the Registers part of chapter 3 of the System V Application Binary Interface PowerPC Processor Supplement there are no values set in registers r3, r4, r5, r6 and r7. Instead the values specified to appear in all of those registers except r7 are placed on the stack. The value to be placed into register r7, the termination function pointer is not passed to the process.

### 8.4.2 Process Stack (on entry)

Figure 3-31 in System V Application Binary Interface PowerPC Processor Supplement is incorrect. The initial stack must look like the following.

#### Figure 8-1 Initial Process Stack

### 8.4.3 Auxiliary Vector

In addition to the types defined in Chapter 3, Section "Process Initialization", Subsection "Process Stack" of the System V Application Binary Interface PowerPC Processor Supplement the following are also supported:

**Table 8-2 Extra Auxiliary Types**

| Name      | Value | Comment            |
|-----------|-------|--------------------|
| AT_NOTELF | 10    | Program is not ELF |

| <b>Name</b>    | <b>Value</b> | <b>Comment</b>  |
|----------------|--------------|---|
| AT_UID         | 11           | Real uid  |
| AT_EUID        | 12           | Effective uid   |
| AT_GID         | 13           | Real gid  |
| AT_EGID        | 14           | Effective gid   |
| AT_PLATFORM    | 15           | String identifying CPU for optimizations  |
| AT_HWCAP       | 16           | Arch dependent hints at CPU capabilities  |
| AT_CLKTCK      | 17           | Frequency at which times() increments   |
| AT_DCACHEBSIZE | 19           | The a_val member of this entry gives the data cache block size for processors on the system on which this program is running. If the processors have unified caches, AT_DCACHEBSIZE is the same as AT_UCACHEBSIZE         |
| AT_ICACHEBSIZE | 20           | The a_val member of this entry gives the instruction cache block size for processors on the system on which this program is running. If the processors have unified caches, AT_DCACHEBSIZE is the same as AT_UCACHEBSIZE. |
| AT_UCACHEBSIZE | 21           | The a_val member of this entry is zero if the processors on the system on which this program is running do not have a unified instruction and data cache. Otherwise it gives the cache block size.                        |
| AT_IGNOREPPC   | 22           | All entries of this type should be ignored.   |

The last three entries in the table above override the values specified in System V Application Binary Interface PowerPC Processor Supplement.

## 8.5 Coding Examples

LSB-conforming applications may use the coding examples given in Chapter 3, Section "Coding Examples" of the System V Application Binary Interface PowerPC Processor Supplement to guide implementation of fundamental operations in the following areas.

### 8.5.1 Code Model Overview/Architecture Constraints

LSB-Conforming applications may use any of the code models described in Chapter 3, Section "Coding Examples", Subsection "Code Model Overview" of the System V Application Binary Interface PowerPC Processor Supplement.

### 8.5.2 Position-Independent Function Prologue

LSB-Conforming applications may use examples described in Chapter 3, Section "Coding Examples", Subsection "Function Prologue and Epilogue" of the System V Application Binary Interface PowerPC Processor Supplement.

### 8.5.3 Data Objects

LSB-Conforming applications may use examples described in Chapter 3, Section "Coding Examples", Subsection "Data Objects" of the System V Application Binary Interface PowerPC Processor Supplement.

### 8.5.4 Function Calls

LSB-Conforming applications may use examples described in Chapter 3, Section "Coding Examples", Subsection "Function Calls" of the System V Application Binary Interface PowerPC Processor Supplement.

### 8.5.5 Branching

LSB-Conforming applications may use examples described in Chapter 3, Section "Coding Examples", Subsection "Branching" of the System V Application Binary Interface PowerPC Processor Supplement.

## 8.6 C Stack Frame

### 8.6.1 Variable Argument List

LSB-Conforming applications shall only use variable arguments to functions in the manner described in Chapter 3, Section "Function Calling Sequence", Subsection "Variable Argument Lists" of the System V Application Binary Interface PowerPC Processor Supplement.

### 8.6.2 Dynamic Allocation of Stack Space

LSB-Conforming applications shall follow guidelines discussed in Chapter 3, Section "Coding Examples", Subsection "Dynamic Stack Space Allocation" of the System V Application Binary Interface PowerPC Processor Supplement.

## 8.7 Debug Information

The LSB does not currently specify the format of Debug information.



## 9 Object Format

### 9.1 Introduction

LSB-conforming implementations shall support an object file , called Executable and Linking Format (ELF) as defined by the System V Application Binary Interface PowerPC Processor Supplement and as supplemented by the Linux Standard Base Specification and this document. LSB-conforming implementations need not support tags related functionality. LSB-conforming applications must not rely on tags related functionality.

### 9.2 ELF Header

#### 9.2.1 Machine Information

LSB-conforming applications shall use the Machine Information as defined in System V Application Binary Interface PowerPC Processor Supplement, Chapter 4, Section "ELF Header" Subsection "Machine Information".

### 9.3 Sections

#### 9.3.1 Special Sections

The following sections are defined in the System V Application Binary Interface PowerPC Processor Supplement Chapter 4, Section "Section", Subsection "Special Sections".

Table 9-1 ELF Special Sections

| Name   | Type         | Attributes                        |
|--------|--------------|-----------------------------------|
| .got   | SHT_PROGBITS | SHF_ALLOC+SHF_WRITE+SHF_EXECINSTR |
| .plt   | SHT_NOBITS   | SHF_ALLOC+SHF_WRITE+SHF_EXECINSTR |
| .sdata | SHT_PROGBITS | SHF_ALLOC+SHF_WRITE               |

.got

This section holds the global offset table. See 'Coding Examples' in Chapter 3, 'Special Sections' in Chapter 4, and 'Global Offset Table' in Chapter 5 of the processor supplement for more information.

.plt

This section holds the Procedure Linkage Table

.sdata

This section holds initialized small data that contribute to the program memory image

Note that the .tags, .taglist and .tagsym sections described in Chapter 4, Section "Sections" System V Application Binary Interface PowerPC Processor Supplement are not supported.

### 9.3.2 Linux Special Sections

The following Linux PPC32 specific sections are defined here.

**Table 9-2 Additional Special Sections**

| <b>Name</b> | <b>Type</b>  | <b>Attributes</b>   |
|-------------|--------------|---------------------|
| .got2       | SHT_PROGBITS | SHF_ALLOC+SHF_WRITE |
| .rela.bss   | SHT_RELA     | SHF_ALLOC           |
| .rela.dyn   | SHT_RELA     | SHF_ALLOC           |
| .rela.got   | SHT_RELA     | SHF_ALLOC           |
| .rela.got2  | SHT_RELA     | SHF_ALLOC           |
| .rela.plt   | SHT_RELA     | SHF_ALLOC           |
| .rela.sbss  | SHT_RELA     | SHF_ALLOC           |
| .sbss       | SHT_NOBITS   | SHF_ALLOC+SHF_WRITE |
| .sdata2     | SHT_PROGBITS | SHF_ALLOC           |

.got2

This section holds the second level GOT

.rela.bss

This section holds RELA type relocation information for the BSS section of a shared library or dynamically linked application

.rela.dyn

This section holds RELA type relocation information for all sections of a shared library except the PLT

.rela.got

This section holds RELA type relocation information for the GOT section of a shared library or dynamically linked application

.rela.got2

This section holds RELA type relocation information for the second level GOT section of a shared library or dynamically linked application

.rela.plt

This section holds RELA type relocation information for the PLT section of a shared library or dynamically linked application

.rela.sbss

This section holds RELA type relocation information for the SBSS section of a shared library or dynamically linked application

.sbss

This section holds uninitialized data that contribute to the program's memory image. The system initializes the data with zeroes when the program begins to run.

.sdata2

This section holds the second level of initialised small data

## 9.4 Symbol Table

LSB-conforming applications shall use the Symbol Table as defined in Chapter 4, Section "Symbol Table" of the System V Application Binary Interface PowerPC Processor Supplement.

## 9.5 Relocation

LSB-conforming applications shall use Relocations as defined in Chapter 4, Section "Relocation" of the System V Application Binary Interface PowerPC Processor Supplement.

### 9.5.1 Relocation Types

LSB-conforming applications shall support the relocation types as defined in the Chapter 4, Section "Relocation" Subsection "Relocation Types" except for the relocation type `R_PPC_ADDR30` as specified in Table 4-8 of System V Application Binary Interface PowerPC Processor Supplement.

## 10 Program Loading and Dynamic Linking

### 10.1 Introduction

LSB-conforming implementations shall support the object file information and system actions that create running programs as specified in the System V ABI, System V Application Binary Interface PowerPC Processor Supplement Chapter 5 and as supplemented by the generic Linux Standard Base Specification and this document.

### 10.2 Program Header

LSB-conforming applications shall support the program header as defined in the System V Application Binary Interface PowerPC Processor Supplement Chapter 5, Section "Program Loading".

### 10.3 Program Loading

LSB-conforming implementations shall map file pages to virtual memory pages as described in Section "Program Loading" of the System V Application Binary Interface PowerPC Processor Supplement, Chapter 5.

### 10.4 Dynamic Linking

LSB-conforming implementations shall provide dynamic linking as specified in Section "Dynamic Linking" of the System V Application Binary Interface PowerPC Processor Supplement, Chapter 5.

#### 10.4.1 Dynamic Section

The following dynamic entries are defined in the System V Application Binary Interface PowerPC Processor Supplement, Chapter 5, Section "Dynamic Linking".

DT\_JMPREL

This entry is associated with a table of relocation entries for the procedure linkage table. This entry is mandatory both for executable and shared object files

DT\_PLTGOT

This entry's `d_ptr` member gives the address of the first byte in the procedure linkage table

In addition the following dynamic entries are also supported:

DT\_RELACOUNT

The number of relative relocations in `.rela.dyn`

#### 10.4.2 Global Offset Table

LSB-conforming implementations shall support a Global Offset Table as described in Chapter 5, Section "Dynamic Linking" of the System V Application Binary Interface PowerPC Processor Supplement.

### **10.4.3 Function Addresses**

Function addresses shall behave as described in Chapter 5, Section "Dynamic Linking", Subsection "Function Addresses" of the System V Application Binary Interface PowerPC Processor Supplement.

### **10.4.4 Procedure Linkage Table**

LSB-conforming implementations shall support a Procedure Linkage Table as described in Chapter 5, Section "Dynamic Linking", Subsection "Procedure Linkage Table" of the System V Application Binary Interface PowerPC Processor Supplement.

## 11 Libraries

An LSB-conforming implementation shall support base libraries which provide interfaces for accessing the operating system, processor and other hardware in the system.

Only those interfaces that are unique to the PowerPC 32 platform are defined here. This section should be used in conjunction with the corresponding section in the generic Linux Standard Base Core Specification.

### 11.1 Program Interpreter/Dynamic Linker

The LSB specifies the Program Interpreter to be `/lib/ld-1sb-ppc32.so.3`.

### 11.2 Interfaces for libc

Table 11-1 defines the library name and shared object name for the libc library

**Table 11-1 libc Definition**

|          |           |
|----------|-----------|
| Library: | libc      |
| SONAME:  | libc.so.6 |

The behavior of the interfaces in this library is specified by the following specifications:

Large File Support  
this specification  
SUSv2  
ISO POSIX (2003)  
SVID Issue 3  
SVID Issue 4

#### 11.2.1 RPC

##### 11.2.1.1 Interfaces for RPC

An LSB conforming implementation shall provide the architecture specific functions for RPC specified in Table 11-2, with the full mandatory functionality as described in the referenced underlying specification.

**Table 11-2 libc - RPC Function Interfaces**

|   |   |  |  |   |
|---|---|--|--|---|
| <code>authnone_create(GLIBC_2.0)</code> [1]   | <code>svc_getreqset(GLIBC_2.0)</code> [2] | <code>svcudp_create(GLIBC_2.0)</code> [3]      | <code>xdr_int(GLIBC_2.0)</code> [2]    | <code>xdr_u_long(GLIBC_2.0)</code> [2]  |
| <code>clnt_create(GLIBC_2.0)</code> [1]       | <code>svc_register(GLIBC_2.0)</code> [3]  | <code>xdr_accepted_reply(GLIBC_2.0)</code> [2] | <code>xdr_long(GLIBC_2.0)</code> [2]   | <code>xdr_u_short(GLIBC_2.0)</code> [2] |
| <code>clnt_pcreateerror(GLIBC_2.0)</code> [1] | <code>svc_run(GLIBC_2.0)</code> [3]       | <code>xdr_array(GLIBC_2.0)</code> [2]          | <code>xdr_opaque(GLIBC_2.0)</code> [2] | <code>xdr_union(GLIBC_2.0)</code> [2]   |
| <code>clnt_perrno(G</code>                    | <code>svc_sendrepl</code>                 | <code>xdr_bool(GLI</code>                      | <code>xdr_opaque_a</code>              | <code>xdr_vector(G</code>               |

|                                     |                                   |                            |                                   |                               |
|-------------------------------------|-----------------------------------|----------------------------|-----------------------------------|-------------------------------|
| LIBC_2.0) [1]                       | y(GLIBC_2.0) [3]                  | BC_2.0) [2]                | uth(GLIBC_2.0) [2]                | LIBC_2.0) [2]                 |
| clnt_perror(GLIBC_2.0) [1]          | svcerr_auth(GLIBC_2.0) [2]        | xdr_bytes(GLIBC_2.0) [2]   | xdr_pointer(GLIBC_2.0) [2]        | xdr_void(GLIBC_2.0) [2]       |
| clnt_sprecreateerror(GLIBC_2.0) [1] | svcerr_decode(GLIBC_2.0) [2]      | xdr_callhdr(GLIBC_2.0) [2] | xdr_reference(GLIBC_2.0) [2]      | xdr_wrapstring(GLIBC_2.0) [2] |
| clnt_sperrno(GLIBC_2.0) [1]         | svcerr_noprocedure(GLIBC_2.0) [2] | xdr_callmsg(GLIBC_2.0) [2] | xdr_rejected_reply(GLIBC_2.0) [2] | xdrmem_create(GLIBC_2.0) [2]  |
| clnt_sperror(GLIBC_2.0) [1]         | svcerr_noprogram(GLIBC_2.0) [2]   | xdr_char(GLIBC_2.0) [2]    | xdr_replymsg(GLIBC_2.0) [2]       | xdrrec_create(GLIBC_2.0) [2]  |
| key_decryptsession(GLIBC_2.1) [2]   | svcerr_procedure(GLIBC_2.0) [2]   | xdr_double(GLIBC_2.0) [2]  | xdr_short(GLIBC_2.0) [2]          | xdrrec_eof(GLIBC_2.0) [2]     |
| pmap_getport(GLIBC_2.0) [3]         | svcerr_systemerror(GLIBC_2.0) [2] | xdr_enum(GLIBC_2.0) [2]    | xdr_string(GLIBC_2.0) [2]         |                               |
| pmap_set(GLIBC_2.0) [3]             | svcerr_weakauth(GLIBC_2.0) [2]    | xdr_float(GLIBC_2.0) [2]   | xdr_u_char(GLIBC_2.0) [2]         |                               |
| pmap_unset(GLIBC_2.0) [3]           | svctcp_create(GLIBC_2.0) [3]      | xdr_free(GLIBC_2.0) [2]    | xdr_u_int(GLIBC_2.0) [3]          |                               |

*Referenced Specification(s)*

[1]. SVID Issue 4

[2]. SVID Issue 3

[3]. this specification

## 11.2.2 System Calls

### 11.2.2.1 Interfaces for System Calls

An LSB conforming implementation shall provide the architecture specific functions for System Calls specified in Table 11-3, with the full mandatory functionality as described in the referenced underlying specification.

**Table 11-3 libc - System Calls Function Interfaces**

|                          |                       |                           |                          |                            |
|--------------------------|-----------------------|---------------------------|--------------------------|----------------------------|
| __fxstat(GLIBC_2.0) [1]  | fchmod(GLIBC_2.0) [2] | getwd(GLIBC_2.0) [2]      | read(GLIBC_2.0) [2]      | setrlimit(GLIBC_2.2) [2]   |
| __getpgid(GLIBC_2.0) [1] | fchown(GLIBC_2.0) [2] | initgroups(GLIBC_2.0) [1] | readdir(GLIBC_2.0) [2]   | setrlimit64(GLIBC_2.1) [3] |
| __lxstat(GLIBC_2.0) [1]  | fcntl(GLIBC_2.0) [1]  | ioctl(GLIBC_2.0) [1]      | readdir_r(GLIBC_2.0) [2] | setsid(GLIBC_2.0) [2]      |

|                         |                             |                           |                                       |                         |
|-------------------------|-----------------------------|---------------------------|---------------------------------------|-------------------------|
| __xmknod(GLIBC_2.0) [1] | fdatasync(GLIBC_2.0) [2]    | kill(GLIBC_2.0) [1]       | readlink(GLIBC_2.0) [2]               | setuid(GLIBC_2.0) [2]   |
| __xstat(GLIBC_2.0) [1]  | flock(GLIBC_2.0) [1]        | killpg(GLIBC_2.0) [2]     | readv(GLIBC_2.0) [2]                  | sleep(GLIBC_2.0) [2]    |
| access(GLIBC_2.0) [2]   | fork(GLIBC_2.0) [2]         | lchown(GLIBC_2.0) [2]     | rename(GLIBC_2.0) [2]                 | statvfs(GLIBC_2.1) [2]  |
| acct(GLIBC_2.0) [1]     | fstatvfs(GLIBC_2.1) [2]     | link(GLIBC_2.0) [1]       | rmdir(GLIBC_2.0) [2]                  | stime(GLIBC_2.0) [1]    |
| alarm(GLIBC_2.0) [2]    | fsync(GLIBC_2.0) [2]        | lockf(GLIBC_2.0) [2]      | sbrk(GLIBC_2.0) [4]                   | symlink(GLIBC_2.0) [2]  |
| brk(GLIBC_2.0) [4]      | ftime(GLIBC_2.0) [2]        | lseek(GLIBC_2.0) [2]      | sched_get_priority_max(GLIBC_2.0) [2] | sync(GLIBC_2.0) [2]     |
| chdir(GLIBC_2.0) [2]    | ftruncate(GLIBC_2.0) [2]    | mkdir(GLIBC_2.0) [2]      | sched_get_priority_min(GLIBC_2.0) [2] | sysconf(GLIBC_2.0) [2]  |
| chmod(GLIBC_2.0) [2]    | getcontext(GLIBC_2.3.4) [2] | mknfif(GLIBC_2.0) [2]     | sched_getparam(GLIBC_2.0) [2]         | time(GLIBC_2.0) [2]     |
| chown(GLIBC_2.1) [2]    | getegid(GLIBC_2.0) [2]      | mlock(GLIBC_2.0) [2]      | sched_getscheduler(GLIBC_2.0) [2]     | times(GLIBC_2.0) [2]    |
| chroot(GLIBC_2.0) [4]   | geteuid(GLIBC_2.0) [2]      | mlockall(GLIBC_2.0) [2]   | sched_rr_getinterval(GLIBC_2.0) [2]   | truncate(GLIBC_2.0) [2] |
| clock(GLIBC_2.0) [2]    | getgid(GLIBC_2.0) [2]       | mmap(GLIBC_2.0) [2]       | sched_setparam(GLIBC_2.0) [2]         | ulimit(GLIBC_2.0) [2]   |
| close(GLIBC_2.0) [2]    | getgroups(GLIBC_2.0) [2]    | mprotect(GLIBC_2.0) [2]   | sched_setscheduler(GLIBC_2.0) [2]     | umask(GLIBC_2.0) [2]    |
| closedir(GLIBC_2.0) [2] | getitimer(GLIBC_2.0) [2]    | msync(GLIBC_2.0) [2]      | sched_yield(GLIBC_2.0) [2]            | uname(GLIBC_2.0) [2]    |
| creat(GLIBC_2.0) [2]    | getloadavg(GLIBC_2.2) [1]   | munlock(GLIBC_2.0) [2]    | select(GLIBC_2.0) [2]                 | unlink(GLIBC_2.0) [1]   |
| dup(GLIBC_2.0) [2]      | getpagesize(GLIBC_2.0) [4]  | munlockall(GLIBC_2.0) [2] | setcontext(GLIBC_2.3.4) [2]           | utime(GLIBC_2.0) [2]    |
| dup2(GLIBC_2.0) [2]     | getpgid(GLIBC_2.0) [2]      | munmap(GLIBC_2.0) [2]     | setegid(GLIBC_2.0) [2]                | utimes(GLIBC_2.0) [2]   |
| execl(GLIBC_2.0) [2]    | getpgrp(GLIBC_2.0) [2]      | nanosleep(GLIBC_2.0) [2]  | seteuid(GLIBC_2.0) [2]                | vfork(GLIBC_2.0) [2]    |
| execle(GLIBC_2.0) [2]   | getpid(GLIBC_2.0) [2]       | nice(GLIBC_2.0) [2]       | setgid(GLIBC_2.0) [2]                 | wait(GLIBC_2.0) [2]     |



|                       |                            |                         |                            |                        |
|-----------------------|----------------------------|-------------------------|----------------------------|------------------------|
| _2.0) [2]             | _2.0) [2]                  | .0) [2]                 | _2.0) [2]                  | .0) [2]                |
| execlp(GLIBC_2.0) [2] | getppid(GLIBC_2.0) [2]     | open(GLIBC_2.0) [2]     | setitimer(GLIBC_2.0) [2]   | wait4(GLIBC_2.0) [1]   |
| execv(GLIBC_2.0) [2]  | getpriority(GLIBC_2.0) [2] | opendir(GLIBC_2.0) [2]  | setpgid(GLIBC_2.0) [2]     | waitpid(GLIBC_2.0) [1] |
| execve(GLIBC_2.0) [2] | getrlimit(GLIBC_2.2) [2]   | pathconf(GLIBC_2.0) [2] | setpgrp(GLIBC_2.0) [2]     | write(GLIBC_2.0) [2]   |
| execvp(GLIBC_2.0) [2] | getrusage(GLIBC_2.0) [2]   | pause(GLIBC_2.0) [2]    | setpriority(GLIBC_2.0) [2] | writew(GLIBC_2.0) [2]  |
| exit(GLIBC_2.0) [2]   | getsid(GLIBC_2.0) [2]      | pipe(GLIBC_2.0) [2]     | setregid(GLIBC_2.0) [2]    |                        |
| fchdir(GLIBC_2.0) [2] | getuid(GLIBC_2.0) [2]      | poll(GLIBC_2.0) [2]     | setreuid(GLIBC_2.0) [2]    |                        |

Referenced Specification(s)

[1]. this specification

[2]. ISO POSIX (2003)

[3]. Large File Support

[4]. SUSv2

## 11.2.3 Standard I/O

### 11.2.3.1 Interfaces for Standard I/O

An LSB conforming implementation shall provide the architecture specific functions for Standard I/O specified in Table 11-4, with the full mandatory functionality as described in the referenced underlying specification.

Table 11-4 libc - Standard I/O Function Interfaces

|                         |                                |                              |                                 |                          |
|-------------------------|--------------------------------|------------------------------|---------------------------------|--------------------------|
| _IO_feof(GLIBC_2.0) [1] | fgetpos(GLIBC_2.2) [2]         | fsetpos(GLIBC_2.2) [2]       | putchar(GLIBC_2.0) [2]          | sscanf(GLIBC_2.0) [1]    |
| _IO_getc(GLIBC_2.0) [1] | fgets(GLIBC_2.0) [2]           | ftell(GLIBC_2.0) [2]         | putchar_unlocked(GLIBC_2.0) [2] | telldir(GLIBC_2.0) [2]   |
| _IO_putc(GLIBC_2.0) [1] | fgetwc_unlocked(GLIBC_2.2) [1] | ftello(GLIBC_2.1) [2]        | puts(GLIBC_2.0) [2]             | tempnam(GLIBC_2.0) [2]   |
| _IO_puts(GLIBC_2.0) [1] | fileno(GLIBC_2.0) [2]          | fwrite(GLIBC_2.0) [2]        | putw(GLIBC_2.0) [3]             | ungetc(GLIBC_2.0) [2]    |
| asprintf(GLIBC_2.0) [1] | flockfile(GLIBC_2.0) [2]       | getc(GLIBC_2.0) [2]          | remove(GLIBC_2.0) [2]           | vasprintf(GLIBC_2.0) [1] |
| clearerr(GLIBC_2.0) [2] | fopen(GLIBC_2.1) [2]           | getc_unlocked(GLIBC_2.0) [2] | rewind(GLIBC_2.0) [2]           | vdprintf(GLIBC_2.0) [1]  |

|                                |                        |                                 |                          |                          |
|--------------------------------|------------------------|---------------------------------|--------------------------|--------------------------|
| ctermid(GLIBC_2.0) [2]         | fprintf(GLIBC_2.0) [2] | getchar(GLIBC_2.0) [2]          | rewinddir(GLIBC_2.0) [2] | vfprintf(GLIBC_2.0) [2]  |
| fclose(GLIBC_2.1) [2]          | fputc(GLIBC_2.0) [2]   | getchar_unlocked(GLIBC_2.0) [2] | scanf(GLIBC_2.0) [1]     | vprintf(GLIBC_2.0) [2]   |
| fdopen(GLIBC_2.1) [2]          | fputs(GLIBC_2.0) [2]   | getw(GLIBC_2.0) [3]             | seekdir(GLIBC_2.0) [2]   | vsnprintf(GLIBC_2.0) [2] |
| feof(GLIBC_2.0) [2]            | fread(GLIBC_2.0) [2]   | pclose(GLIBC_2.1) [2]           | setbuf(GLIBC_2.0) [2]    | vsprintf(GLIBC_2.0) [2]  |
| ferror(GLIBC_2.0) [2]          | freopen(GLIBC_2.0) [2] | popen(GLIBC_2.1) [2]            | setbuffer(GLIBC_2.0) [1] |                          |
| fflush(GLIBC_2.0) [2]          | fscanf(GLIBC_2.0) [1]  | printf(GLIBC_2.0) [2]           | setvbuf(GLIBC_2.0) [2]   |                          |
| fflush_unlocked(GLIBC_2.0) [1] | fseek(GLIBC_2.0) [2]   | putc(GLIBC_2.0) [2]             | snprintf(GLIBC_2.0) [2]  |                          |
| fgetc(GLIBC_2.0) [2]           | fseeko(GLIBC_2.1) [2]  | putc_unlocked(GLIBC_2.0) [2]    | sprintf(GLIBC_2.0) [2]   |                          |

Referenced Specification(s)

- [1]. this specification
- [2]. ISO POSIX (2003)
- [3]. SUSv2

An LSB conforming implementation shall provide the architecture specific data interfaces for Standard I/O specified in Table 11-5, with the full mandatory functionality as described in the referenced underlying specification.

**Table 11-5 libc - Standard I/O Data Interfaces**

|                       |                      |                       |  |  |
|-----------------------|----------------------|-----------------------|--|--|
| stderr(GLIBC_2.0) [1] | stdin(GLIBC_2.0) [1] | stdout(GLIBC_2.0) [1] |  |  |
|-----------------------|----------------------|-----------------------|--|--|

Referenced Specification(s)

- [1]. ISO POSIX (2003)

## 11.2.4 Signal Handling

### 11.2.4.1 Interfaces for Signal Handling

An LSB conforming implementation shall provide the architecture specific functions for Signal Handling specified in Table 11-6, with the full mandatory functionality as described in the referenced underlying specification.

**Table 11-6 libc - Signal Handling Function Interfaces**

|  |                          |                        |                         |                       |
|--|--------------------------|------------------------|-------------------------|-----------------------|
| __libc_current_sigrtmax(GLIBC_2.1) [2] | sigaction(GLIBC_2.0) [2] | sighold(GLIBC_2.1) [2] | sigorset(GLIBC_2.0) [1] | sigset(GLIBC_2.1) [2] |
|--|--------------------------|------------------------|-------------------------|-----------------------|

|                                       |                            |                              |                            |                             |
|---------------------------------------|----------------------------|------------------------------|----------------------------|-----------------------------|
| IBC_2.1) [1]                          |                            |                              |                            |                             |
| __libc_current_sigtmin(GLIBC_2.1) [1] | sigaddset(GLIBC_2.0) [2]   | sigignore(GLIBC_2.1) [2]     | sigpause(GLIBC_2.0) [2]    | sigsuspend(GLIBC_2.0) [2]   |
| __sigsetjmp(GLIBC_2.3.4) [1]          | sigaltstack(GLIBC_2.0) [2] | siginterrupt(GLIBC_2.0) [2]  | sigpending(GLIBC_2.0) [2]  | sigtimedwait(GLIBC_2.1) [2] |
| __sysv_signal(GLIBC_2.0) [1]          | sigandset(GLIBC_2.0) [1]   | sigisemptyset(GLIBC_2.0) [1] | sigprocmask(GLIBC_2.0) [2] | sigwait(GLIBC_2.0) [2]      |
| bsd_signal(GLIBC_2.0) [2]             | sigdelset(GLIBC_2.0) [2]   | sigismember(GLIBC_2.0) [2]   | sigqueue(GLIBC_2.1) [2]    | sigwaitinfo(GLIBC_2.1) [2]  |
| psignal(GLIBC_2.0) [1]                | sigemptyset(GLIBC_2.0) [2] | siglongjmp(GLIBC_2.3.4) [2]  | sigrelse(GLIBC_2.1) [2]    |                             |
| raise(GLIBC_2.0) [2]                  | sigfillset(GLIBC_2.0) [2]  | signal(GLIBC_2.0) [2]        | sigreturn(GLIBC_2.0) [1]   |                             |

*Referenced Specification(s)*

[1]. this specification

[2]. ISO POSIX (2003)

An LSB conforming implementation shall provide the architecture specific data interfaces for Signal Handling specified in Table 11-7, with the full mandatory functionality as described in the referenced underlying specification.

**Table 11-7 libc - Signal Handling Data Interfaces**

|                                |  |  |  |  |
|--------------------------------|--|--|--|--|
| __sys_siglist(GLIBC_2.3.3) [1] |  |  |  |  |
|--------------------------------|--|--|--|--|

*Referenced Specification(s)*

[1]. this specification

## 11.2.5 Localization Functions

### 11.2.5.1 Interfaces for Localization Functions

An LSB conforming implementation shall provide the architecture specific functions for Localization Functions specified in Table 11-8, with the full mandatory functionality as described in the referenced underlying specification.

**Table 11-8 libc - Localization Functions Function Interfaces**

|  |                          |                          |                           |                          |
|--|--------------------------|--------------------------|---------------------------|--------------------------|
| bind_textdomain_codeset(GLIBC_2.2) [1] | catopen(GLIBC_2.0) [2]   | dngettext(GLIBC_2.2) [1] | iconv_open(GLIBC_2.1) [2] | setlocale(GLIBC_2.0) [2] |
| bindtextdomain                         | dcgettext(GLIBC_2.0) [2] | gettext(GLIBC_2.0) [2]   | localeconv(G)             | textdomain(G)            |

|                         |                           |                            |                            |               |
|-------------------------|---------------------------|----------------------------|----------------------------|---------------|
| in(GLIBC_2.0) [1]       | BC_2.0) [1]               | C_2.0) [1]                 | LIBC_2.2) [2]              | LIBC_2.0) [1] |
| catclose(GLIBC_2.0) [2] | dcngettext(GLIBC_2.2) [1] | iconv(GLIBC_2.1) [2]       | ngettext(GLIBC_2.2) [1]    |               |
| catgets(GLIBC_2.0) [2]  | dgettext(GLIBC_2.0) [1]   | iconv_close(GLIBC_2.1) [2] | nl_langinfo(GLIBC_2.0) [2] |               |

Referenced Specification(s)

[1]. this specification

[2]. ISO POSIX (2003)

An LSB conforming implementation shall provide the architecture specific data interfaces for Localization Functions specified in Table 11-9, with the full mandatory functionality as described in the referenced underlying specification.

**Table 11-9 libc - Localization Functions Data Interfaces**

|                                 |  |  |  |  |
|---------------------------------|--|--|--|--|
| _nl_msg_cat_cntr(GLIBC_2.0) [1] |  |  |  |  |
|---------------------------------|--|--|--|--|

Referenced Specification(s)

[1]. this specification

## 11.2.6 Socket Interface

### 11.2.6.1 Interfaces for Socket Interface

An LSB conforming implementation shall provide the architecture specific functions for Socket Interface specified in Table 11-10, with the full mandatory functionality as described in the referenced underlying specification.

**Table 11-10 libc - Socket Interface Function Interfaces**

|                                   |                                 |                               |                             |                           |
|-----------------------------------|---------------------------------|-------------------------------|-----------------------------|---------------------------|
| __h_errno_location(GLIBC_2.0) [1] | gethostname(GLIBC_2.0) [2]      | if_nameindex(GLIBC_2.1) [2]   | send(GLIBC_2.0) [2]         | socket(GLIBC_2.0) [2]     |
| accept(GLIBC_2.0) [2]             | getpeername(GLIBC_2.0) [2]      | if_nametoindex(GLIBC_2.1) [2] | sendmsg(GLIBC_2.0) [2]      | socketpair(GLIBC_2.0) [2] |
| bind(GLIBC_2.0) [2]               | getsockname(GLIBC_2.0) [2]      | listen(GLIBC_2.0) [2]         | sendto(GLIBC_2.0) [2]       |                           |
| bindresvport(GLIBC_2.0) [1]       | getsockopt(GLIBC_2.0) [1]       | recv(GLIBC_2.0) [2]           | setsockopt(GLIBC_2.0) [1]   |                           |
| connect(GLIBC_2.0) [2]            | if_freenameindex(GLIBC_2.1) [2] | recvfrom(GLIBC_2.0) [2]       | shutdown(GLIBC_2.0) [2]     |                           |
| gethostid(GLIBC_2.0) [1]          | if_indextona                    | recvmsg(GLIBC_2.0) [2]        | socketatmark(GLIBC_2.0) [2] |                           |

|             |                   |             |                 |  |
|-------------|-------------------|-------------|-----------------|--|
| BC_2.0) [2] | me(GLIBC_2.1) [2] | BC_2.0) [2] | LIBC_2.2.4) [2] |  |
|-------------|-------------------|-------------|-----------------|--|

Referenced Specification(s)

[1]. this specification

[2]. ISO POSIX (2003)

## 11.2.7 Wide Characters

### 11.2.7.1 Interfaces for Wide Characters

An LSB conforming implementation shall provide the architecture specific functions for Wide Characters specified in Table 11-11, with the full mandatory functionality as described in the referenced underlying specification.

**Table 11-11 libc - Wide Characters Function Interfaces**

|                                      |                           |                           |                           |                          |
|--------------------------------------|---------------------------|---------------------------|---------------------------|--------------------------|
| __wctod_int<br>ernal(GLIBC_2.0) [1]  | mbsinit(GLIBC_2.0) [2]    | vwscanf(GLIBC_2.2) [1]    | wcsnlen(GLIBC_2.1) [1]    | wcstoumax(GLIBC_2.1) [2] |
| __wctof_int<br>ernal(GLIBC_2.0) [1]  | mbsnrtowcs(GLIBC_2.0) [1] | wcpcpy(GLIBC_2.0) [1]     | wcsnrtombs(GLIBC_2.0) [1] | wcstouq(GLIBC_2.0) [1]   |
| __wctol_int<br>ernal(GLIBC_2.0) [1]  | mbsrtowcs(GLIBC_2.0) [2]  | wcpcpy(GLIBC_2.0) [1]     | wcspbrk(GLIBC_2.0) [2]    | wcswcs(GLIBC_2.1) [2]    |
| __wctold_int<br>ernal(GLIBC_2.0) [1] | mbstowcs(GLIBC_2.0) [2]   | wcrtomb(GLIBC_2.0) [2]    | wcsrchr(GLIBC_2.0) [2]    | wcswidth(GLIBC_2.0) [2]  |
| __wctoul_int<br>ernal(GLIBC_2.0) [1] | mbtowc(GLIBC_2.0) [2]     | wcscasecmp(GLIBC_2.1) [1] | wcsrtombs(GLIBC_2.0) [2]  | wcsxfrm(GLIBC_2.0) [2]   |
| btowc(GLIBC_2.0) [2]                 | putwc(GLIBC_2.2) [2]      | wcscat(GLIBC_2.0) [2]     | wcsspn(GLIBC_2.0) [2]     | wctob(GLIBC_2.0) [2]     |
| fgetwc(GLIBC_2.2) [2]                | putwchar(GLIBC_2.2) [2]   | wcschr(GLIBC_2.0) [2]     | wcsstr(GLIBC_2.0) [2]     | wctomb(GLIBC_2.0) [2]    |
| fgetws(GLIBC_2.2) [2]                | swprintf(GLIBC_2.2) [2]   | wcscmp(GLIBC_2.0) [2]     | wctod(GLIBC_2.0) [2]      | wctrans(GLIBC_2.0) [2]   |
| fputwc(GLIBC_2.2) [2]                | swscanf(GLIBC_2.2) [1]    | wscoll(GLIBC_2.0) [2]     | wctof(GLIBC_2.0) [2]      | wctype(GLIBC_2.0) [2]    |
| fputws(GLIBC_2.2) [2]                | towctrans(GLIBC_2.0) [2]  | wscopy(GLIBC_2.0) [2]     | wctoimax(GLIBC_2.1) [2]   | wcwidth(GLIBC_2.0) [2]   |
| fwide(GLIBC_2.2) [2]                 | towlower(GLIBC_2.0) [2]   | wcscspn(GLIBC_2.0) [2]    | wctok(GLIBC_2.0) [2]      | wmemchr(GLIBC_2.0) [2]   |
| fwprintf(GLIBC_2.2) [2]              | towupper(GLIBC_2.0) [2]   | wcsdup(GLIBC_2.0) [1]     | wcstol(GLIBC_2.0) [2]     | wmemcmp(GLIBC_2.0) [2]   |

|                         |                          |                            |                         |                         |
|-------------------------|--------------------------|----------------------------|-------------------------|-------------------------|
| fwscanf(GLIBC_2.2) [1]  | ungetwc(GLIBC_2.2) [2]   | wcsftime(GLIBC_2.2) [2]    | wcstold(GLIBC_2.0) [2]  | wmemcpy(GLIBC_2.0) [2]  |
| getwc(GLIBC_2.2) [2]    | vfwprintf(GLIBC_2.2) [2] | wcslen(GLIBC_2.0) [2]      | wcstoll(GLIBC_2.1) [2]  | wmemmove(GLIBC_2.0) [2] |
| getwchar(GLIBC_2.2) [2] | vfwscanf(GLIBC_2.2) [1]  | wcsncasecmp(GLIBC_2.1) [1] | wcstombs(GLIBC_2.0) [2] | wmemset(GLIBC_2.0) [2]  |
| mblen(GLIBC_2.0) [2]    | vswprintf(GLIBC_2.2) [2] | wcsncat(GLIBC_2.0) [2]     | wcstoq(GLIBC_2.0) [1]   | wprintf(GLIBC_2.2) [2]  |
| mbrlen(GLIBC_2.0) [2]   | vswscanf(GLIBC_2.2) [1]  | wcsncmp(GLIBC_2.0) [2]     | wcstoul(GLIBC_2.0) [2]  | wscanf(GLIBC_2.2) [1]   |
| mbrtowc(GLIBC_2.0) [2]  | vwprintf(GLIBC_2.2) [2]  | wcsncpy(GLIBC_2.0) [2]     | wcstoull(GLIBC_2.1) [2] |                         |

Referenced Specification(s)

[1]. this specification

[2]. ISO POSIX (2003)

## 11.2.8 String Functions

### 11.2.8.1 Interfaces for String Functions

An LSB conforming implementation shall provide the architecture specific functions for String Functions specified in Table 11-12, with the full mandatory functionality as described in the referenced underlying specification.

**Table 11-12 libc - String Functions Function Interfaces**

|                                  |                       |                           |                         |                          |
|----------------------------------|-----------------------|---------------------------|-------------------------|--------------------------|
| __memcpy(GLIBC_2.0) [1]          | bzero(GLIBC_2.0) [2]  | strcasestr(GLIBC_2.1) [1] | strncat(GLIBC_2.0) [2]  | strtok(GLIBC_2.0) [2]    |
| __rawmemchr(GLIBC_2.1) [1]       | ffs(GLIBC_2.0) [2]    | strcat(GLIBC_2.0) [2]     | strncmp(GLIBC_2.0) [2]  | strtok_r(GLIBC_2.0) [2]  |
| __stpcpy(GLIBC_2.0) [1]          | index(GLIBC_2.0) [2]  | strchr(GLIBC_2.0) [2]     | strncpy(GLIBC_2.0) [2]  | strtol(GLIBC_2.0) [2]    |
| __strdup(GLIBC_2.0) [1]          | memcpy(GLIBC_2.0) [2] | strcmp(GLIBC_2.0) [2]     | strndup(GLIBC_2.0) [1]  | strtoll(GLIBC_2.0) [2]   |
| __strtod_internal(GLIBC_2.0) [1] | memchr(GLIBC_2.0) [2] | strcoll(GLIBC_2.0) [2]    | strlen(GLIBC_2.0) [1]   | strtoq(GLIBC_2.0) [1]    |
| __strtof_internal(GLIBC_2.0) [1] | memcmp(GLIBC_2.0) [2] | strcpy(GLIBC_2.0) [2]     | strpbrk(GLIBC_2.0) [2]  | strtoull(GLIBC_2.0) [2]  |
| __strtok_r(GLIBC_2.0) [1]        | memcpy(GLIBC_2.0) [2] | strcspn(GLIBC_2.0) [2]    | strptime(GLIBC_2.0) [2] | strtoumax(GLIBC_2.0) [2] |

|                                    |                           |                            |                          |                        |
|------------------------------------|---------------------------|----------------------------|--------------------------|------------------------|
| IBC_2.0) [1]                       | BC_2.0) [2]               | C_2.0) [2]                 | BC_2.0) [1]              | IBC_2.1) [2]           |
| __strtol_internal(GLIBC_2.0) [1]   | memmove(GLIBC_2.0) [2]    | strdup(GLIBC_2.0) [2]      | strchr(GLIBC_2.0) [2]    | strtouq(GLIBC_2.0) [1] |
| __strtold_internal(GLIBC_2.0) [1]  | memrchr(GLIBC_2.2) [1]    | strerror(GLIBC_2.0) [2]    | strsep(GLIBC_2.0) [1]    | strxfrm(GLIBC_2.0) [2] |
| __strtoll_internal(GLIBC_2.0) [1]  | memset(GLIBC_2.0) [2]     | strerror_r(GLIBC_2.0) [1]  | strsignal(GLIBC_2.0) [1] | swab(GLIBC_2.0) [2]    |
| __strtoul_internal(GLIBC_2.0) [1]  | rindex(GLIBC_2.0) [2]     | strfmon(GLIBC_2.0) [2]     | strspn(GLIBC_2.0) [2]    |                        |
| __strtoull_internal(GLIBC_2.0) [1] | stpcpy(GLIBC_2.0) [1]     | strftime(GLIBC_2.0) [2]    | strstr(GLIBC_2.0) [2]    |                        |
| bcmp(GLIBC_2.0) [2]                | stpncpy(GLIBC_2.0) [1]    | strlen(GLIBC_2.0) [2]      | strtof(GLIBC_2.0) [2]    |                        |
| bcopy(GLIBC_2.0) [2]               | strcasecmp(GLIBC_2.0) [2] | strncasecmp(GLIBC_2.0) [2] | strtoimax(GLIBC_2.1) [2] |                        |

*Referenced Specification(s)*

[1]. this specification

[2]. ISO POSIX (2003)

## 11.2.9 IPC Functions

### 11.2.9.1 Interfaces for IPC Functions

An LSB conforming implementation shall provide the architecture specific functions for IPC Functions specified in Table 11-13, with the full mandatory functionality as described in the referenced underlying specification.

**Table 11-13 libc - IPC Functions Function Interfaces**

|                       |                       |                       |                       |  |
|-----------------------|-----------------------|-----------------------|-----------------------|--|
| ftok(GLIBC_2.0) [1]   | msgrcv(GLIBC_2.0) [1] | semget(GLIBC_2.0) [1] | shmctl(GLIBC_2.2) [1] |  |
| msgctl(GLIBC_2.2) [1] | msgsnd(GLIBC_2.0) [1] | semop(GLIBC_2.0) [1]  | shmdt(GLIBC_2.0) [1]  |  |
| msgget(GLIBC_2.0) [1] | semctl(GLIBC_2.2) [1] | shmat(GLIBC_2.0) [1]  | shmget(GLIBC_2.0) [1] |  |

*Referenced Specification(s)*

[1]. ISO POSIX (2003)

## 11.2.10 Regular Expressions

### 11.2.10.1 Interfaces for Regular Expressions

An LSB conforming implementation shall provide the architecture specific functions for Regular Expressions specified in Table 11-14, with the full mandatory functionality as described in the referenced underlying specification.

**Table 11-14 libc - Regular Expressions Function Interfaces**

|                        |                         |                            |                        |  |
|------------------------|-------------------------|----------------------------|------------------------|--|
| regcomp(GLIBC_2.0) [1] | regerror(GLIBC_2.0) [1] | regexexec(GLIBC_2.3.4) [2] | regfree(GLIBC_2.0) [1] |  |
|------------------------|-------------------------|----------------------------|------------------------|--|

*Referenced Specification(s)*

[1]. ISO POSIX (2003)

[2]. this specification

## 11.2.11 Character Type Functions

### 11.2.11.1 Interfaces for Character Type Functions

An LSB conforming implementation shall provide the architecture specific functions for Character Type Functions specified in Table 11-15, with the full mandatory functionality as described in the referenced underlying specification.

**Table 11-15 libc - Character Type Functions Function Interfaces**

|                                       |                        |                         |                          |                        |
|---------------------------------------|------------------------|-------------------------|--------------------------|------------------------|
| __ctype_get_mb_cur_max(GLIBC_2.0) [1] | isdigit(GLIBC_2.0) [2] | iswalnum(GLIBC_2.0) [2] | iswlower(GLIBC_2.0) [2]  | toascii(GLIBC_2.0) [2] |
| _tolower(GLIBC_2.0) [2]               | isgraph(GLIBC_2.0) [2] | iswalpha(GLIBC_2.0) [2] | iswprint(GLIBC_2.0) [2]  | tolower(GLIBC_2.0) [2] |
| _toupper(GLIBC_2.0) [2]               | islower(GLIBC_2.0) [2] | iswblank(GLIBC_2.1) [2] | iswpunct(GLIBC_2.0) [2]  | toupper(GLIBC_2.0) [2] |
| isalnum(GLIBC_2.0) [2]                | isprint(GLIBC_2.0) [2] | iswcntrl(GLIBC_2.0) [2] | iswspace(GLIBC_2.0) [2]  |                        |
| isalpha(GLIBC_2.0) [2]                | ispunct(GLIBC_2.0) [2] | iswctype(GLIBC_2.0) [2] | iswupper(GLIBC_2.0) [2]  |                        |
| isascii(GLIBC_2.0) [2]                | isspace(GLIBC_2.0) [2] | iswdigit(GLIBC_2.0) [2] | iswxdigit(GLIBC_2.0) [2] |                        |
| iscntrl(GLIBC_2.0) [2]                | isupper(GLIBC_2.0) [2] | iswgraph(GLIBC_2.0) [2] | isxdigit(GLIBC_2.0) [2]  |                        |

*Referenced Specification(s)*

[1]. this specification

[2]. ISO POSIX (2003)



## 11.2.12 Time Manipulation

### 11.2.12.1 Interfaces for Time Manipulation

An LSB conforming implementation shall provide the architecture specific functions for Time Manipulation specified in Table 11-16, with the full mandatory functionality as described in the referenced underlying specification.

**Table 11-16 libc - Time Manipulation Function Interfaces**

|                          |                         |                          |                            |                       |
|--------------------------|-------------------------|--------------------------|----------------------------|-----------------------|
| adjtime(GLIBC_2.0) [1]   | ctime(GLIBC_2.0) [2]    | gmtime(GLIBC_2.0) [2]    | localtime_r(GLIBC_2.0) [2] | ualarm(GLIBC_2.0) [2] |
| asctime(GLIBC_2.0) [2]   | ctime_r(GLIBC_2.0) [2]  | gmtime_r(GLIBC_2.0) [2]  | mktime(GLIBC_2.0) [2]      |                       |
| asctime_r(GLIBC_2.0) [2] | difftime(GLIBC_2.0) [2] | localtime(GLIBC_2.0) [2] | tzset(GLIBC_2.0) [2]       |                       |

*Referenced Specification(s)*

[1]. this specification

[2]. ISO POSIX (2003)

An LSB conforming implementation shall provide the architecture specific data interfaces for Time Manipulation specified in Table 11-17, with the full mandatory functionality as described in the referenced underlying specification.

**Table 11-17 libc - Time Manipulation Data Interfaces**

|                           |                         |                         |  |  |
|---------------------------|-------------------------|-------------------------|--|--|
| __daylight(GLIBC_2.0) [1] | __tzname(GLIBC_2.0) [1] | timezone(GLIBC_2.0) [2] |  |  |
| __timezone(GLIBC_2.0) [1] | daylight(GLIBC_2.0) [2] | tzname(GLIBC_2.0) [2]   |  |  |

*Referenced Specification(s)*

[1]. this specification

[2]. ISO POSIX (2003)

## 11.2.13 Terminal Interface Functions

### 11.2.13.1 Interfaces for Terminal Interface Functions

An LSB conforming implementation shall provide the architecture specific functions for Terminal Interface Functions specified in Table 11-18, with the full mandatory functionality as described in the referenced underlying specification.

**Table 11-18 libc - Terminal Interface Functions Function Interfaces**

|                            |                            |                        |                          |                            |
|----------------------------|----------------------------|------------------------|--------------------------|----------------------------|
| cfgetispeed(GLIBC_2.0) [1] | cfsetispeed(GLIBC_2.0) [1] | tcdrain(GLIBC_2.0) [1] | tcgetattr(GLIBC_2.0) [1] | tcsendbreak(GLIBC_2.0) [1] |
| cfgetospeed(GLIBC_2.0) [1] | cfsetospeed(GLIBC_2.0) [1] | tcflow(GLIBC_2.0) [1]  | tcgetpgrp(GLIBC_2.0) [1] | tcsetattr(GLIBC_2.0) [1]   |

|                              |                                |                            |                             |                              |
|------------------------------|--------------------------------|----------------------------|-----------------------------|------------------------------|
| cfmakeraw(G<br>LIBC_2.0) [2] | cfsetpspeed(GL<br>IBC_2.0) [2] | tcflush(GLIB<br>C_2.0) [1] | tcgetsid(GLIB<br>C_2.1) [1] | tcsetpgrp(GLI<br>BC_2.0) [1] |
|------------------------------|--------------------------------|----------------------------|-----------------------------|------------------------------|

*Referenced Specification(s)*

[1]. ISO POSIX (2003)

[2]. this specification

## 11.2.14 System Database Interface

### 11.2.14.1 Interfaces for System Database Interface

An LSB conforming implementation shall provide the architecture specific functions for System Database Interface specified in Table 11-19, with the full mandatory functionality as described in the referenced underlying specification.

**Table 11-19 libc - System Database Interface Function Interfaces**

|                                   |   |                                     |                                |                                |
|-----------------------------------|---|-------------------------------------|--------------------------------|--------------------------------|
| endgrent(GLI<br>BC_2.0) [1]       | getgrgid_r(G<br>LIBC_2.1.2)<br>[1]      | getprotoent(G<br>LIBC_2.0) [1]      | getservent(GL<br>IBC_2.0) [1]  | setgroups(GL<br>IBC_2.0) [2]   |
| endprotoent(<br>GLIBC_2.0)<br>[1] | getgrnam(GLI<br>BC_2.0) [1]             | getpwent(GLI<br>BC_2.0) [1]         | gettutent(GLIB<br>C_2.0) [2]   | setprotoent(G<br>LIBC_2.0) [1] |
| endpwent(GL<br>IBC_2.0) [1]       | getgrnam_r(G<br>LIBC_2.1.2)<br>[1]      | getpwnam(G<br>LIBC_2.0) [1]         | gettutent_r(GL<br>IBC_2.0) [2] | setpwent(GLI<br>BC_2.0) [1]    |
| endservent(G<br>LIBC_2.0) [1]     | getgrouplist(<br>GLIBC_2.2.4)<br>[2]    | getpwnam_r(<br>GLIBC_2.1.2)<br>[1]  | gettutxent(GLI<br>BC_2.1) [1]  | setservent(GL<br>IBC_2.0) [1]  |
| endtutent(GLI<br>BC_2.0) [3]      | gethostbyadd<br>r(GLIBC_2.0)<br>[1]     | getpwuid(GL<br>IBC_2.0) [1]         | gettutxid(GLI<br>BC_2.1) [1]   | settutent(GLIB<br>C_2.0) [2]   |
| endtutxent(GL<br>IBC_2.1) [1]     | gethostbynam<br>e(GLIBC_2.0)<br>[1]     | getpwuid_r(G<br>LIBC_2.1.2)<br>[1]  | gettutxline(GL<br>IBC_2.1) [1] | settutxent(GLI<br>BC_2.1) [1]  |
| getgrent(GLI<br>BC_2.0) [1]       | getprotobyname(GLIBC_2.<br>0) [1]       | getservbyname(GLIBC_2.0)<br>[1]     | pututxline(GL<br>IBC_2.1) [1]  | utmpname(G<br>LIBC_2.0) [2]    |
| getgrgid(GLI<br>BC_2.0) [1]       | getprotobynu<br>mber(GLIBC_<br>2.0) [1] | getservbyport<br>(GLIBC_2.0)<br>[1] | setgrent(GLIB<br>C_2.0) [1]    |                                |

*Referenced Specification(s)*

[1]. ISO POSIX (2003)

[2]. this specification

[3]. SUSv2

## 11.2.15 Language Support

### 11.2.15.1 Interfaces for Language Support

An LSB conforming implementation shall provide the architecture specific functions for Language Support specified in Table 11-20, with the full mandatory functionality as described in the referenced underlying specification.

**Table 11-20 libc - Language Support Function Interfaces**

|                                  |  |  |  |  |
|----------------------------------|--|--|--|--|
| __libc_start_main(GLIBC_2.0) [1] |  |  |  |  |
|----------------------------------|--|--|--|--|

*Referenced Specification(s)*

[1]. this specification

## 11.2.16 Large File Support

### 11.2.16.1 Interfaces for Large File Support

An LSB conforming implementation shall provide the architecture specific functions for Large File Support specified in Table 11-21, with the full mandatory functionality as described in the referenced underlying specification.

**Table 11-21 libc - Large File Support Function Interfaces**

|                           |                           |                            |                          |                           |
|---------------------------|---------------------------|----------------------------|--------------------------|---------------------------|
| __fxstat64(GLIBC_2.2) [1] | fopen64(GLIBC_2.1) [2]    | ftello64(GLIBC_2.1) [2]    | mkstemp64(GLIBC_2.2) [2] | tmpfile64(GLIBC_2.1) [2]  |
| __lxstat64(GLIBC_2.2) [1] | freopen64(GLIBC_2.1) [2]  | ftruncate64(GLIBC_2.1) [2] | mmap64(GLIBC_2.1) [2]    | truncate64(GLIBC_2.1) [2] |
| __xstat64(GLIBC_2.2) [1]  | fseeko64(GLIBC_2.1) [2]   | ftw64(GLIBC_2.1) [2]       | nftw64(GLIBC_2.3.3) [2]  |                           |
| creat64(GLIBC_2.1) [2]    | fsetpos64(GLIBC_2.2) [2]  | getrlimit64(GLIBC_2.2) [2] | readdir64(GLIBC_2.2) [2] |                           |
| fgetpos64(GLIBC_2.2) [2]  | fstatvfs64(GLIBC_2.1) [2] | lockf64(GLIBC_2.1) [2]     | statvfs64(GLIBC_2.1) [2] |                           |

*Referenced Specification(s)*

[1]. this specification

[2]. Large File Support

## 11.2.17 Standard Library

### 11.2.17.1 Interfaces for Standard Library

An LSB conforming implementation shall provide the architecture specific functions for Standard Library specified in Table 11-22, with the full mandatory functionality as described in the referenced underlying specification.

**Table 11-22 libc - Standard Library Function Interfaces**

|                      |                        |                             |                        |                      |
|----------------------|------------------------|-----------------------------|------------------------|----------------------|
| _Exit(GLIBC_2.0) [1] | dirname(GLIBC_2.0) [1] | gettimeofday(GLIBC_2.0) [1] | lrand48(GLIBC_2.0) [1] | srand(GLIBC_2.0) [1] |
|----------------------|------------------------|-----------------------------|------------------------|----------------------|

|                                 |                             |                           |                               |                              |
|---------------------------------|-----------------------------|---------------------------|-------------------------------|------------------------------|
| 2.1.1) [1]                      | BC_2.0) [1]                 | GLIBC_2.0) [1]            | C_2.0) [1]                    | _2.0) [1]                    |
| __assert_fail(GLIBC_2.0) [2]    | div(GLIBC_2.0) [1]          | glob(GLIBC_2.0) [1]       | lsearch(GLIBC_2.0) [1]        | srand48(GLIBC_2.0) [1]       |
| __cxa_atexit(GLIBC_2.1.3) [2]   | drand48(GLIBC_2.0) [1]      | glob64(GLIBC_2.2) [2]     | makecontext(GLIBC_2.3.4) [1]  | srandom(GLIBC_2.0) [1]       |
| __errno_location(GLIBC_2.0) [2] | ecvt(GLIBC_2.0) [1]         | globfree(GLIBC_2.0) [1]   | malloc(GLIBC_2.0) [1]         | strtod(GLIBC_2.0) [1]        |
| __fpending(GLIBC_2.2) [2]       | erand48(GLIBC_2.0) [1]      | globfree64(GLIBC_2.1) [2] | memmem(GLIBC_2.0) [2]         | strtol(GLIBC_2.0) [1]        |
| __getpagesize(GLIBC_2.0) [2]    | err(GLIBC_2.0) [2]          | grantpt(GLIBC_2.1) [1]    | mkstemp(GLIBC_2.0) [1]        | strtoul(GLIBC_2.0) [1]       |
| __isinf(GLIBC_2.0) [2]          | error(GLIBC_2.0) [2]        | hcreate(GLIBC_2.0) [1]    | mktemp(GLIBC_2.0) [1]         | swapcontext(GLIBC_2.3.4) [1] |
| __isinff(GLIBC_2.0) [2]         | errx(GLIBC_2.0) [2]         | hdestroy(GLIBC_2.0) [1]   | mrnd48(GLIBC_2.0) [1]         | syslog(GLIBC_2.0) [1]        |
| __isinfl(GLIBC_2.0) [2]         | fcvt(GLIBC_2.0) [1]         | hsearch(GLIBC_2.0) [1]    | nftw(GLIBC_2.3.3) [1]         | system(GLIBC_2.0) [2]        |
| __isnan(GLIBC_2.0) [2]          | fmtmsg(GLIBC_2.1) [1]       | htonl(GLIBC_2.0) [1]      | nrnd48(GLIBC_2.0) [1]         | tdelete(GLIBC_2.0) [1]       |
| __isnanf(GLIBC_2.0) [2]         | fnmatch(GLIBC_2.2.3) [1]    | htons(GLIBC_2.0) [1]      | ntohl(GLIBC_2.0) [1]          | tfind(GLIBC_2.0) [1]         |
| __isnans(GLIBC_2.0) [2]         | fpathconf(GLIBC_2.0) [1]    | imaxabs(GLIBC_2.1.1) [1]  | ntohs(GLIBC_2.0) [1]          | tmpfile(GLIBC_2.1) [1]       |
| __sysconf(GLIBC_2.2) [2]        | free(GLIBC_2.0) [1]         | imaxdiv(GLIBC_2.1.1) [1]  | openlog(GLIBC_2.0) [1]        | tmpnam(GLIBC_2.0) [1]        |
| _exit(GLIBC_2.0) [1]            | freeaddrinfo(GLIBC_2.0) [1] | inet_addr(GLIBC_2.0) [1]  | perror(GLIBC_2.0) [1]         | tsearch(GLIBC_2.0) [1]       |
| _longjmp(GLIBC_2.3.4) [1]       | ftrylockfile(GLIBC_2.0) [1] | inet_ntoa(GLIBC_2.0) [1]  | posix_memalign(GLIBC_2.2) [1] | ttynname(GLIBC_2.0) [1]      |
| _setjmp(GLIBC_2.3.4) [1]        | ftw(GLIBC_2.0) [1]          | inet_ntop(GLIBC_2.0) [1]  | posix_openpt(GLIBC_2.2.1) [1] | ttynname_r(GLIBC_2.0) [1]    |
| a64l(GLIBC_2.0) [1]             | funlockfile(GLIBC_2.0) [1]  | inet_pton(GLIBC_2.0) [1]  | ptsname(GLIBC_2.1) [1]        | twalk(GLIBC_2.0) [1]         |
| abort(GLIBC_2.0) [1]            | gai_strerror(GLIBC_2.0) [1] | initstate(GLIBC_2.0) [1]  | putenv(GLIBC_2.0) [1]         | unlockpt(GLIBC_2.0) [1]      |

|                         |                                 |                          |                            |                         |
|-------------------------|---------------------------------|--------------------------|----------------------------|-------------------------|
| 2.0) [1]                | LIBC_2.1) [1]                   | C_2.0) [1]               | C_2.0) [1]                 | BC_2.1) [1]             |
| abs(GLIBC_2.0) [1]      | gcvt(GLIBC_2.0) [1]             | insque(GLIBC_2.0) [1]    | qsort(GLIBC_2.0) [1]       | unsetenv(GLIBC_2.0) [1] |
| atof(GLIBC_2.0) [1]     | getaddrinfo(GLIBC_2.0) [1]      | isatty(GLIBC_2.0) [1]    | rand(GLIBC_2.0) [1]        | usleep(GLIBC_2.0) [1]   |
| atoi(GLIBC_2.0) [1]     | getcwd(GLIBC_2.0) [1]           | isblank(GLIBC_2.0) [1]   | rand_r(GLIBC_2.0) [1]      | verrx(GLIBC_2.0) [2]    |
| atol(GLIBC_2.0) [1]     | getdate(GLIBC_2.1) [1]          | jrands48(GLIBC_2.0) [1]  | random(GLIBC_2.0) [1]      | vfscanf(GLIBC_2.0) [2]  |
| atoll(GLIBC_2.0) [1]    | getenv(GLIBC_2.0) [1]           | l64a(GLIBC_2.0) [1]      | realloc(GLIBC_2.0) [1]     | vscanf(GLIBC_2.0) [2]   |
| basename(GLIBC_2.0) [1] | getlogin(GLIBC_2.0) [1]         | labs(GLIBC_2.0) [1]      | realpath(GLIBC_2.3) [1]    | vsscanf(GLIBC_2.0) [2]  |
| bsearch(GLIBC_2.0) [1]  | getlogin_r(GLIBC_2.0) [1]       | lcong48(GLIBC_2.0) [1]   | remque(GLIBC_2.0) [1]      | vsyslog(GLIBC_2.0) [2]  |
| calloc(GLIBC_2.0) [1]   | getnameinfo(GLIBC_2.1) [1]      | ldiv(GLIBC_2.0) [1]      | seed48(GLIBC_2.0) [1]      | warn(GLIBC_2.0) [2]     |
| closelog(GLIBC_2.0) [1] | getopt(GLIBC_2.0) [2]           | lfind(GLIBC_2.0) [1]     | setenv(GLIBC_2.0) [1]      | warnx(GLIBC_2.0) [2]    |
| confstr(GLIBC_2.0) [1]  | getopt_long(GLIBC_2.0) [2]      | llabs(GLIBC_2.0) [1]     | sethostname(GLIBC_2.0) [2] | wordexp(GLIBC_2.1) [1]  |
| cuserid(GLIBC_2.0) [3]  | getopt_long_only(GLIBC_2.0) [2] | lldiv(GLIBC_2.0) [1]     | setlogmask(GLIBC_2.0) [1]  | wordfree(GLIBC_2.1) [1] |
| daemon(GLIBC_2.0) [2]   | getsubopt(GLIBC_2.0) [1]        | longjmp(GLIBC_2.3.4) [1] | setstate(GLIBC_2.0) [1]    |                         |

Referenced Specification(s)

[1]. ISO POSIX (2003)

[2]. this specification

[3]. SUSv2

An LSB conforming implementation shall provide the architecture specific data interfaces for Standard Library specified in Table 11-23, with the full mandatory functionality as described in the referenced underlying specification.

**Table 11-23 libc - Standard Library Data Interfaces**

|                          |                             |                            |                       |                       |
|--------------------------|-----------------------------|----------------------------|-----------------------|-----------------------|
| __environ(GLIBC_2.0) [1] | _sys_errlist(GLIBC_2.3) [1] | getdate_err(GLIBC_2.1) [2] | opterr(GLIBC_2.0) [2] | optopt(GLIBC_2.0) [2] |
| __environ(GLIBC_2.0) [1] | environ(GLIBC_2.0) [2]      | optarg(GLIBC_2.0) [2]      | optind(GLIBC_2.0) [2] |                       |

*Referenced Specification(s)*

[1]. this specification

[2]. ISO POSIX (2003)

**11.3 Data Definitions for libc**

This section defines global identifiers and their values that are associated with interfaces contained in libc. These definitions are organized into groups that correspond to system headers. This convention is used as a convenience for the reader, and does not imply the existence of these headers, or their content.

These definitions are intended to supplement those provided in the referenced underlying specifications.

This specification uses ISO/IEC 9899 C Language as the reference programming language, and data definitions are specified in ISO C format. The C language is used here as a convenient notation. Using a C language description of these data objects does not preclude their use by other programming languages.

**11.3.1 errno.h**

```
#define EDEADLOCK          58
```

**11.3.2 fcntl.h**

```
#define F_GETLK64          12
#define F_SETLK64          13
#define F_SETLKW64        14
```

**11.3.3 inttypes.h**

```
typedef unsigned long long int uintmax_t;
typedef long long int intmax_t;
typedef unsigned int uintptr_t;
typedef unsigned long long int uint64_t;
```

**11.3.4 limits.h**

```
#define ULONG_MAX          0xFFFFFFFFFUL
#define LONG_MAX           2147483647L

#define CHAR_MIN           0
#define CHAR_MAX           255

#define PTHREAD_STACK_MIN 16384
```

**11.3.5 setjmp.h**

```
typedef long int __jmp_buf[112] __attribute__((aligned(16)));
```

**11.3.6 signal.h**

```
#define SIGEV_PAD_SIZE    ((SIGEV_MAX_SIZE/sizeof(int))-3)
```

```

#define SI_PAD_SIZE      ((SI_MAX_SIZE/sizeof(int))-3)

struct sigaction
{
    union
    {
        sighandler_t _sa_handler;
        void (*_sa_sigaction) (int, siginfo_t *, void *);
    }
    __sigaction_handler;
    sigset_t sa_mask;
    unsigned long int sa_flags;
    void (*sa_restorer) (void);
}
;

#define MINSIGSTKSZ      2048
#define SIGSTKSZ         8192

struct sigcontext
{
    long int _unused[4];
    int signal;
    unsigned long int handler;
    unsigned long int oldmask;
    struct pt_regs *regs;
}
;

```

### 11.3.7 stddef.h

```

typedef unsigned int size_t;
typedef int ptrdiff_t;

```

### 11.3.8 stdio.h

```

#define __IO_FILE_SIZE  152

```

### 11.3.9 sys/ioctl.h

```

#define TIOCGWINSZ      0x40087468
#define TIOCNOTTY      0x5422
#define FIONREAD        1074030207

```

### 11.3.10 sys/ipc.h

```

struct ipc_perm
{
    key_t __key;
    uid_t uid;
    gid_t gid;
    uid_t cuid;
    uid_t cgid;
    mode_t mode;
    long int __seq;
    int __pad1;
    unsigned long long int __unused1;
    unsigned long long int __unused2;
}

```

;

### 11.3.11 sys/mman.h

```
#define MCL_FUTURE      16384
#define MCL_CURRENT    8192
```

### 11.3.12 sys/msg.h

```
typedef unsigned long int msglen_t;
typedef unsigned long int msgqnum_t;
```

```
struct msqid_ds
{
    struct ipc_perm msg_perm;
    unsigned int __unused1;
    time_t msg_stime;
    unsigned int __unused2;
    time_t msg_rtime;
    unsigned int __unused3;
    time_t msg_ctime;
    unsigned long int __msg_cbytes;
    msgqnum_t msg_qnum;
    msglen_t msg_qbytes;
    pid_t msg_lspid;
    pid_t msg_lrpid;
    unsigned long int __unused4;
    unsigned long int __unused5;
};
```

### 11.3.13 sys/sem.h

```
struct semid_ds
{
    struct ipc_perm sem_perm;
    unsigned int __unused1;
    time_t sem_otime;
    unsigned int __unused2;
    time_t sem_ctime;
    unsigned long int sem_nsems;
    unsigned long int __unused3;
    unsigned long int __unused4;
};
```

### 11.3.14 sys/shm.h

```
#define SHMLBA (__getpagesize())

typedef unsigned long int shmatt_t;

struct shmid_ds
{
    struct ipc_perm shm_perm;
    unsigned int __unused1;
    time_t shm_atime;
    unsigned int __unused2;
    time_t shm_dtime;
```



```

unsigned int __unused3;
time_t shm_ctime;
unsigned int __unused4;
size_t shm_segsz;
pid_t shm_cpid;
pid_t shm_lpid;
shmatt_t shm_nattch;
unsigned long int __unused5;
unsigned long int __unused6;
}
;

```

### 11.3.15 sys/socket.h

```

typedef uint32_t __ss_aligntype;

#define SO_RCVLOWAT 16
#define SO_SNDLOWAT 17
#define SO_RCVTIMEO 18
#define SO_SNDTIMEO 19

```

### 11.3.16 sys/stat.h

```

#define _STAT_VER 3

struct stat64
{
    dev_t st_dev;
    ino64_t st_ino;
    mode_t st_mode;
    nlink_t st_nlink;
    uid_t st_uid;
    gid_t st_gid;
    dev_t st_rdev;
    unsigned short __pad2;
    off64_t st_size;
    blksize_t st_blksize;
    blkcnt64_t st_blocks;
    struct timespec st_atim;
    struct timespec st_mtim;
    struct timespec st_ctim;
    unsigned long int __unused4;
    unsigned long int __unused5;
}
;

struct stat
{
    dev_t st_dev;
    unsigned short __pad1;
    ino_t st_ino;
    mode_t st_mode;
    nlink_t st_nlink;
    uid_t st_uid;
    gid_t st_gid;
    dev_t st_rdev;
    unsigned short __pad2;
    off_t st_size;
    blksize_t st_blksize;
    blkcnt_t st_blocks;
    struct timespec st_atim;
    struct timespec st_mtim;
    struct timespec st_ctim;
}
;

```

```

    unsigned long int __unused4;
    unsigned long int __unused5;
}
;

```

### 11.3.17 sys/statvfs.h

```

struct statvfs
{
    unsigned long int f_bsize;
    unsigned long int f_frsize;
    fsblkcnt_t f_blocks;
    fsblkcnt_t f_bfree;
    fsblkcnt_t f_bavail;
    fsfilcnt_t f_files;
    fsfilcnt_t f_ffree;
    fsfilcnt_t f_favail;
    unsigned long int f_fsid;
    int __f_unused;
    unsigned long int f_flag;
    unsigned long int f_namemax;
    int __f_spare[6];
}
;

struct statvfs64
{
    unsigned long int f_bsize;
    unsigned long int f_frsize;
    fsblkcnt64_t f_blocks;
    fsblkcnt64_t f_bfree;
    fsblkcnt64_t f_bavail;
    fsfilcnt64_t f_files;
    fsfilcnt64_t f_ffree;
    fsfilcnt64_t f_favail;
    unsigned long int f_fsid;
    int __f_unused;
    unsigned long int f_flag;
    unsigned long int f_namemax;
    int __f_spare[6];
}
;

```

### 11.3.18 sys/types.h

```

typedef long long int int64_t;

typedef int32_t ssize_t;

#define __FDSET_LONGS 32

```

### 11.3.19 termios.h

```

#define TAB1 1024
#define CR3 12288
#define CRDLY 12288
#define FF1 16384
#define FFDLY 16384
#define XCASE 16384
#define ONLCR 2
#define TAB2 2048

```

```

#define TAB3      3072
#define TABDLY    3072
#define BS1       32768
#define BSDLY     32768
#define OLCUC     4
#define CR1       4096
#define IUCLC     4096
#define VT1       65536
#define VTDLY     65536
#define NLDLY     768
#define CR2       8192

#define VWERASE   10
#define VREPRINT      11
#define VSUSP     12
#define VSTART    13
#define VSTOP     14
#define VDISCARD  16
#define VMIN      5
#define VEOL      6
#define VEOL2     8
#define VSWTC     9

#define IXOFF     1024
#define IXON      512

#define CSTOPB   1024
#define HUPCL    16384
#define CREAD    2048
#define CS6      256
#define CLOCAL   32768
#define PARENB   4096
#define CS7      512
#define VTIME    7
#define CS8      768
#define CSIZE    768
#define PARODD   8192

#define NOFLSH   0x80000000
#define ECHOKE   1
#define IEXTEN   1024
#define ISIG     128
#define ECHONL   16
#define ECHOE    2
#define ICANON   256
#define ECHOPRT  32
#define ECHOK    4
#define TOSTOP   4194304
#define PENDIN   536870912
#define ECHOCTL  64
#define FLUSHO   8388608

```

### 11.3.20 ucontext.h

```

struct pt_regs
{
    unsigned long int gpr[32];
    unsigned long int nip;
    unsigned long int msr;
    unsigned long int orig_gpr3;
    unsigned long int ctr;
    unsigned long int link;
    unsigned long int xer;

```

```

    unsigned long int ccr;
    unsigned long int mq;
    unsigned long int trap;
    unsigned long int dar;
    unsigned long int dsisr;
    unsigned long int result;
}
;
typedef struct _libc_vrstate
{
    unsigned int vrregs[128];
    unsigned int vrsave;
    unsigned int _pad[2];
    unsigned int vschr;
}
vrregset_t __attribute__((__aligned__(16)));

#define NGREG    48

typedef unsigned long int gregset_t[48];

typedef struct _libc_fpstate
{
    double fpregs[32];
    double fpscr;
    int _pad[2];
}
fpregset_t;

typedef struct
{
    gregset_t gregs;
    fpregset_t fpregs;
    vrregset_t vrregs;
}
mcontext_t;

union uc_regs_ptr
{
    struct pt_regs *regs;
    mcontext_t *uc_regs;
}
;

typedef struct ucontext
{
    unsigned long int uc_flags;
    struct ucontext *uc_link;
    stack_t uc_stack;
    int uc_pad[7];
    union uc_regs_ptr uc_mcontext;
    sigset_t uc_sigmask;
    char uc_reg_space[sizeof (mcontext_t) + 12];
}
ucontext_t;

```

### 11.3.21 unistd.h

```
typedef int inptr_t;
```

### 11.3.22 utmp.h

```

struct lastlog
{
    time_t ll_time;
    char ll_line[UT_LINESIZE];
    char ll_host[UT_HOSTSIZE];
}
;

struct utmp
{
    short ut_type;
    pid_t ut_pid;
    char ut_line[UT_LINESIZE];
    char ut_id[4];
    char ut_user[UT_NAMESIZE];
    char ut_host[UT_HOSTSIZE];
    struct exit_status ut_exit;
    long int ut_session;
    struct timeval ut_tv;
    int32_t ut_addr_v6[4];
    char __unused[20];
}
;

```

### 11.3.23 utmpx.h

```

struct utmpx
{
    short ut_type;
    pid_t ut_pid;
    char ut_line[UT_LINESIZE];
    char ut_id[4];
    char ut_user[UT_NAMESIZE];
    char ut_host[UT_HOSTSIZE];
    struct exit_status ut_exit;
    long int ut_session;
    struct timeval ut_tv;
    int32_t ut_addr_v6[4];
    char __unused[20];
}
;

```

## 11.4 Interfaces for libm

Table 11-24 defines the library name and shared object name for the libm library

**Table 11-24 libm Definition**

|          |           |
|----------|-----------|
| Library: | libm      |
| SONAME:  | libm.so.6 |

The behavior of the interfaces in this library is specified by the following specifications:

- ISO C (1999)  
this specification
- SUSv2
- ISO POSIX (2003)

## 11.4.1 Math

### 11.4.1.1 Interfaces for Math

An LSB conforming implementation shall provide the architecture specific functions for Math specified in Table 11-25, with the full mandatory functionality as described in the referenced underlying specification.

**Table 11-25 libm - Math Function Interfaces**

|                              |                        |                              |                          |                           |
|------------------------------|------------------------|------------------------------|--------------------------|---------------------------|
| __finite(GLIBC_2.1) [1]      | ccosl(GLIBC_2.1) [2]   | exp(GLIBC_2.0) [2]           | j1l(GLIBC_2.0) [1]       | powf(GLIBC_2.0) [2]       |
| __finitef(GLIBC_2.1) [1]     | ceil(GLIBC_2.0) [2]    | exp2(GLIBC_2.1) [2]          | jnl(GLIBC_2.0) [2]       | powl(GLIBC_2.0) [2]       |
| __finitel(GLIBC_2.1) [1]     | ceilf(GLIBC_2.0) [2]   | exp2f(GLIBC_2.1) [2]         | jnf(GLIBC_2.0) [1]       | remainder(GLIBC_2.0) [2]  |
| __fpclassify(GLIBC_2.1) [3]  | ceill(GLIBC_2.0) [2]   | expf(GLIBC_2.0) [2]          | jnl(GLIBC_2.0) [1]       | remainderf(GLIBC_2.0) [2] |
| __fpclassifyf(GLIBC_2.1) [3] | cexp(GLIBC_2.1) [2]    | expl(GLIBC_2.0) [2]          | ldexp(GLIBC_2.0) [2]     | remainderl(GLIBC_2.0) [2] |
| __signbit(GLIBC_2.1) [1]     | cexpf(GLIBC_2.1) [2]   | expm1(GLIBC_2.0) [2]         | ldexpf(GLIBC_2.0) [2]    | remquo(GLIBC_2.1) [2]     |
| __signbitf(GLIBC_2.1) [1]    | cexpl(GLIBC_2.1) [2]   | expm1f(GLIBC_2.0) [2]        | ldexpl(GLIBC_2.0) [2]    | remquof(GLIBC_2.1) [2]    |
| acos(GLIBC_2.0) [2]          | cimag(GLIBC_2.1) [2]   | expm1l(GLIBC_2.0) [2]        | lgamma(GLIBC_2.0) [2]    | remquol(GLIBC_2.1) [2]    |
| acosf(GLIBC_2.0) [2]         | cimagf(GLIBC_2.1) [2]  | fabs(GLIBC_2.0) [2]          | lgamma_r(GLIBC_2.0) [1]  | rint(GLIBC_2.0) [2]       |
| acosh(GLIBC_2.0) [2]         | cimagl(GLIBC_2.1) [2]  | fabsf(GLIBC_2.0) [2]         | lgammaf(GLIBC_2.0) [2]   | rintf(GLIBC_2.0) [2]      |
| acoshf(GLIBC_2.0) [2]        | clog(GLIBC_2.1) [2]    | fabsl(GLIBC_2.0) [2]         | lgammaf_r(GLIBC_2.0) [1] | rintl(GLIBC_2.0) [2]      |
| acoshl(GLIBC_2.0) [2]        | clog10(GLIBC_2.1) [1]  | fdim(GLIBC_2.1) [2]          | lgammal(GLIBC_2.0) [2]   | round(GLIBC_2.1) [2]      |
| acosl(GLIBC_2.0) [2]         | clog10f(GLIBC_2.1) [1] | fdimf(GLIBC_2.1) [2]         | lgammal_r(GLIBC_2.0) [1] | roundf(GLIBC_2.1) [2]     |
| asin(GLIBC_2.0) [2]          | clog10l(GLIBC_2.1) [1] | fdiml(GLIBC_2.1) [2]         | llrint(GLIBC_2.1) [2]    | roundl(GLIBC_2.1) [2]     |
| asinf(GLIBC_2.0) [2]         | clogf(GLIBC_2.1) [2]   | feclearexcept(GLIBC_2.2) [2] | llrintf(GLIBC_2.1) [2]   | scalb(GLIBC_2.0) [2]      |
| asinh(GLIBC_2.0) [2]         | clogl(GLIBC_2.1) [2]   | fegetenv(GLIBC_2.2) [2]      | llrintl(GLIBC_2.1) [2]   | scalbf(GLIBC_2.0) [1]     |
| asinhf(GLIBC_2.0) [2]        | conj(GLIBC_2.0) [2]    | fegetexceptfla               | llround(GLIBC_2.1) [2]   | scalbl(GLIBC_2.0) [2]     |

|                       |                          |                                |                         |                              |
|-----------------------|--------------------------|--------------------------------|-------------------------|------------------------------|
| _2.0) [2]             | .1) [2]                  | g(GLIBC_2.2) [2]               | C_2.1) [2]              | _2.0) [1]                    |
| asinh(GLIBC_2.0) [2]  | conjf(GLIBC_2.1) [2]     | fegetround(GLIBC_2.1) [2]      | llroundf(GLIBC_2.1) [2] | scalbln(GLIBC_2.1) [2]       |
| asinl(GLIBC_2.0) [2]  | conjl(GLIBC_2.1) [2]     | feholdexcept(GLIBC_2.1) [2]    | llroundl(GLIBC_2.1) [2] | scalblnf(GLIBC_2.1) [2]      |
| atan(GLIBC_2.0) [2]   | copysign(GLIBC_2.0) [2]  | feraiseexcept(GLIBC_2.2) [2]   | log(GLIBC_2.0) [2]      | scalblnl(GLIBC_2.1) [2]      |
| atan2(GLIBC_2.0) [2]  | copysignf(GLIBC_2.0) [2] | fesetenv(GLIBC_2.2) [2]        | log10(GLIBC_2.0) [2]    | scalbn(GLIBC_2.0) [2]        |
| atan2f(GLIBC_2.0) [2] | copysignl(GLIBC_2.0) [2] | fesetexceptflag(GLIBC_2.2) [2] | log10f(GLIBC_2.0) [2]   | scalbnf(GLIBC_2.0) [2]       |
| atan2l(GLIBC_2.0) [2] | cos(GLIBC_2.0) [2]       | fesetround(GLIBC_2.1) [2]      | log10l(GLIBC_2.0) [2]   | scalbnl(GLIBC_2.0) [2]       |
| atanf(GLIBC_2.0) [2]  | cosf(GLIBC_2.0) [2]      | fetestexcept(GLIBC_2.1) [2]    | log1p(GLIBC_2.0) [2]    | significantd(GLIBC_2.0) [1]  |
| atanh(GLIBC_2.0) [2]  | cosh(GLIBC_2.0) [2]      | feupdateenv(GLIBC_2.2) [2]     | log1pf(GLIBC_2.0) [2]   | significantdf(GLIBC_2.0) [1] |
| atanhf(GLIBC_2.0) [2] | coshf(GLIBC_2.0) [2]     | finite(GLIBC_2.0) [4]          | log1pl(GLIBC_2.0) [2]   | significantd(GLIBC_2.0) [1]  |
| atanhl(GLIBC_2.0) [2] | coshl(GLIBC_2.0) [2]     | finitel(GLIBC_2.0) [1]         | log2(GLIBC_2.1) [2]     | sin(GLIBC_2.0) [2]           |
| atanl(GLIBC_2.0) [2]  | cosl(GLIBC_2.0) [2]      | finitel(GLIBC_2.0) [1]         | log2f(GLIBC_2.1) [2]    | sincos(GLIBC_2.1) [1]        |
| cabs(GLIBC_2.1) [2]   | cpow(GLIBC_2.1) [2]      | floor(GLIBC_2.0) [2]           | log2l(GLIBC_2.1) [2]    | sincosf(GLIBC_2.1) [1]       |
| cabsf(GLIBC_2.1) [2]  | cpowf(GLIBC_2.1) [2]     | floorf(GLIBC_2.0) [2]          | logb(GLIBC_2.0) [2]     | sincosl(GLIBC_2.1) [1]       |
| cabsl(GLIBC_2.1) [2]  | cpowl(GLIBC_2.1) [2]     | floorl(GLIBC_2.0) [2]          | logbf(GLIBC_2.0) [2]    | sinf(GLIBC_2.0) [2]          |
| acos(GLIBC_2.1) [2]   | cproj(GLIBC_2.1) [2]     | fma(GLIBC_2.1) [2]             | logbl(GLIBC_2.0) [2]    | sinh(GLIBC_2.0) [2]          |
| acosf(GLIBC_2.1) [2]  | cprojf(GLIBC_2.1) [2]    | fmaf(GLIBC_2.1) [2]            | logf(GLIBC_2.0) [2]     | sinhf(GLIBC_2.0) [2]         |
| acosh(GLIBC_2.1) [2]  | cprojl(GLIBC_2.1) [2]    | fmal(GLIBC_2.1) [2]            | logl(GLIBC_2.0) [2]     | sinhl(GLIBC_2.0) [2]         |
| acoshf(GLIBC_2.1) [2] | creal(GLIBC_2.1) [2]     | fmax(GLIBC_2.1) [2]            | lrint(GLIBC_2.1) [2]    | sinl(GLIBC_2.0) [2]          |

|                        |                       |                       |                            |                        |
|------------------------|-----------------------|-----------------------|----------------------------|------------------------|
| cacoshl(GLIBC_2.1) [2] | crealf(GLIBC_2.1) [2] | fmaxf(GLIBC_2.1) [2]  | lrintf(GLIBC_2.1) [2]      | sqrt(GLIBC_2.0) [2]    |
| cacosl(GLIBC_2.1) [2]  | creall(GLIBC_2.1) [2] | fmaxl(GLIBC_2.1) [2]  | lrintl(GLIBC_2.1) [2]      | sqrtf(GLIBC_2.0) [2]   |
| carg(GLIBC_2.1) [2]    | csin(GLIBC_2.1) [2]   | fmin(GLIBC_2.1) [2]   | lround(GLIBC_2.1) [2]      | sqrtl(GLIBC_2.0) [2]   |
| cargf(GLIBC_2.1) [2]   | csinf(GLIBC_2.1) [2]  | fminf(GLIBC_2.1) [2]  | lroundf(GLIBC_2.1) [2]     | tan(GLIBC_2.0) [2]     |
| cargl(GLIBC_2.1) [2]   | csinh(GLIBC_2.1) [2]  | fminl(GLIBC_2.1) [2]  | lroundl(GLIBC_2.1) [2]     | tanf(GLIBC_2.0) [2]    |
| casin(GLIBC_2.1) [2]   | csinhf(GLIBC_2.1) [2] | fmod(GLIBC_2.0) [2]   | matherr(GLIBC_2.0) [1]     | tanh(GLIBC_2.0) [2]    |
| casinf(GLIBC_2.1) [2]  | csinhl(GLIBC_2.1) [2] | fmodf(GLIBC_2.0) [2]  | modf(GLIBC_2.0) [2]        | tanhf(GLIBC_2.0) [2]   |
| casinh(GLIBC_2.1) [2]  | csinl(GLIBC_2.1) [2]  | fmodl(GLIBC_2.0) [2]  | modff(GLIBC_2.0) [2]       | tanhf(GLIBC_2.0) [2]   |
| casinhf(GLIBC_2.1) [2] | csqrt(GLIBC_2.1) [2]  | frexp(GLIBC_2.0) [2]  | modfl(GLIBC_2.0) [2]       | tanl(GLIBC_2.0) [2]    |
| casinhl(GLIBC_2.1) [2] | csqrtf(GLIBC_2.1) [2] | frexpf(GLIBC_2.0) [2] | nan(GLIBC_2.1) [2]         | tgamma(GLIBC_2.1) [2]  |
| casinl(GLIBC_2.1) [2]  | csqrtl(GLIBC_2.1) [2] | frexpl(GLIBC_2.0) [2] | nanf(GLIBC_2.1) [2]        | tgammaf(GLIBC_2.1) [2] |
| catan(GLIBC_2.1) [2]   | ctan(GLIBC_2.1) [2]   | gamma(GLIBC_2.0) [4]  | nanl(GLIBC_2.1) [2]        | tgammal(GLIBC_2.1) [2] |
| catanf(GLIBC_2.1) [2]  | ctanf(GLIBC_2.1) [2]  | gammaf(GLIBC_2.0) [1] | nearbyint(GLIBC_2.1) [2]   | trunc(GLIBC_2.1) [2]   |
| catanh(GLIBC_2.1) [2]  | ctanh(GLIBC_2.1) [2]  | gammal(GLIBC_2.0) [1] | nearbyintf(GLIBC_2.1) [2]  | truncf(GLIBC_2.1) [2]  |
| catanhf(GLIBC_2.1) [2] | ctanhf(GLIBC_2.1) [2] | hypot(GLIBC_2.0) [2]  | nearbyintl(GLIBC_2.1) [2]  | truncl(GLIBC_2.1) [2]  |
| catanhl(GLIBC_2.1) [2] | ctanhl(GLIBC_2.1) [2] | hypotf(GLIBC_2.0) [2] | nextafter(GLIBC_2.0) [2]   | y0(GLIBC_2.0) [2]      |
| catanl(GLIBC_2.1) [2]  | ctanl(GLIBC_2.1) [2]  | hypotl(GLIBC_2.0) [2] | nextafterf(GLIBC_2.0) [2]  | y0f(GLIBC_2.0) [1]     |
| cbirt(GLIBC_2.0) [2]   | dremf(GLIBC_2.0) [1]  | ilogb(GLIBC_2.0) [2]  | nextafterl(GLIBC_2.0) [2]  | y0l(GLIBC_2.0) [1]     |
| cbirtf(GLIBC_2.0) [2]  | dreml(GLIBC_2.0) [1]  | ilogbf(GLIBC_2.0) [2] | nexttoward(GLIBC_2.1) [2]  | y1(GLIBC_2.0) [2]      |
| cbirtl(GLIBC_2.0) [2]  | erf(GLIBC_2.0) [2]    | ilogbl(GLIBC_2.0) [2] | nexttowardf(GLIBC_2.1) [2] | y1f(GLIBC_2.0) [1]     |



|                       |                      |                    |                            |                    |
|-----------------------|----------------------|--------------------|----------------------------|--------------------|
| ccos(GLIBC_2.1) [2]   | erfc(GLIBC_2.0) [2]  | j0(GLIBC_2.0) [2]  | nexttowardl(GLIBC_2.1) [2] | y1l(GLIBC_2.0) [1] |
| ccosf(GLIBC_2.1) [2]  | erfcf(GLIBC_2.0) [2] | j0f(GLIBC_2.0) [1] | pow(GLIBC_2.0) [2]         | yn(GLIBC_2.0) [2]  |
| ccosh(GLIBC_2.1) [2]  | erfc1(GLIBC_2.0) [2] | j0l(GLIBC_2.0) [1] | pow10(GLIBC_2.1) [1]       | ynf(GLIBC_2.0) [1] |
| ccoshf(GLIBC_2.1) [2] | erfff(GLIBC_2.0) [2] | j1(GLIBC_2.0) [2]  | pow10f(GLIBC_2.1) [1]      | ynl(GLIBC_2.0) [1] |
| ccoshl(GLIBC_2.1) [2] | erfl(GLIBC_2.0) [2]  | j1f(GLIBC_2.0) [1] | pow10l(GLIBC_2.1) [1]      |                    |

*Referenced Specification(s)*

[1]. ISO C (1999)

[2]. ISO POSIX (2003)

[3]. this specification

[4]. SUSv2

An LSB conforming implementation shall provide the architecture specific data interfaces for Math specified in Table 11-26, with the full mandatory functionality as described in the referenced underlying specification.

**Table 11-26 libm - Math Data Interfaces**

|                        |  |  |  |  |
|------------------------|--|--|--|--|
| signgam(GLIBC_2.0) [1] |  |  |  |  |
|------------------------|--|--|--|--|

*Referenced Specification(s)*

[1]. ISO POSIX (2003)

## 11.5 Data Definitions for libm

This section defines global identifiers and their values that are associated with interfaces contained in libm. These definitions are organized into groups that correspond to system headers. This convention is used as a convenience for the reader, and does not imply the existence of these headers, or their content.

These definitions are intended to supplement those provided in the referenced underlying specifications.

This specification uses ISO/IEC 9899 C Language as the reference programming language, and data definitions are specified in ISO C format. The C language is used here as a convenient notation. Using a C language description of these data objects does not preclude their use by other programming languages.

### 11.5.1 fenv.h

```
#define FE_INVALID      (1 << (31 - 2))
#define FE_OVERFLOW    (1 << (31 - 3))
#define FE_UNDERFLOW  (1 << (31 - 4))
#define FE_DIVBYZERO  (1 << (31 - 5))
```

```
#define FE_INEXACT      (1 << (31 - 6))

#define FE_ALL_EXCEPT (FE_INEXACT | FE_DIVBYZERO | FE_UNDERFLOW |
FE_OVERFLOW | FE_INVALID)

#define FE_TONEAREST    0
#define FE_TOWARDZERO  1
#define FE_UPWARD       2
#define FE_DOWNWARD     3

typedef unsigned int fexcept_t;

typedef double fenv_t;
#define FE_DFL_ENV      (& __fe_dfl_env)
```

### 11.5.2 math.h

```
#define fpclassify(x)  (sizeof (x) == sizeof (float) ?
__fpclassifyf (x) : __fpclassify (x) )
#define signbit(x)    (sizeof (x) == sizeof (float)? __signbitf
(x): __signbit (x))

#define FP_ILOGB0     -2147483647
#define FP_ILOGBNAN   2147483647
```

## 11.6 Interfaces for libpthread

Table 11-27 defines the library name and shared object name for the libpthread library

**Table 11-27 libpthread Definition**

|          |                 |
|----------|-----------------|
| Library: | libpthread      |
| SONAME:  | libpthread.so.0 |

The behavior of the interfaces in this library is specified by the following specifications:

- Large File Support
- this specification
- ISO POSIX (2003)

### 11.6.1 Realtime Threads

#### 11.6.1.1 Interfaces for Realtime Threads

An LSB conforming implementation shall provide the architecture specific functions for Realtime Threads specified in Table 11-28, with the full mandatory functionality as described in the referenced underlying specification.

**Table 11-28 libpthread - Realtime Threads Function Interfaces**

|   |                                      |  |                                      |  |
|---|--------------------------------------|--|--------------------------------------|--|
| pthread_attr_getinheritsched(GLIBC_2.0) [1] | pthread_attr_getscope(GLIBC_2.0) [1] | pthread_attr_setschedpolicy(GLIBC_2.0) [1] | pthread_getschedparam(GLIBC_2.0) [1] |  |
| pthread_attr_                               | pthread_attr_                        | pthread_attr_                              | pthread_setsc                        |  |

|                               |                                |                         |                         |  |
|-------------------------------|--------------------------------|-------------------------|-------------------------|--|
| getschedpolicy(GLIBC_2.0) [1] | setinheritsched(GLIBC_2.0) [1] | setscope(GLIBC_2.0) [1] | hedparam(GLIBC_2.0) [1] |  |
|-------------------------------|--------------------------------|-------------------------|-------------------------|--|

Referenced Specification(s)

[1]. ISO POSIX (2003)

## 11.6.2 Advanced Realtime Threads

### 11.6.2.1 Interfaces for Advanced Realtime Threads

No external functions are defined for libpthread - Advanced Realtime Threads

## 11.6.3 Posix Threads

### 11.6.3.1 Interfaces for Posix Threads

An LSB conforming implementation shall provide the architecture specific functions for Posix Threads specified in Table 11-29, with the full mandatory functionality as described in the referenced underlying specification.

**Table 11-29 libpthread - Posix Threads Function Interfaces**

|  |  |                                      |   |                                       |
|--|--|--------------------------------------|---|---------------------------------------|
| _pthread_cleanup_pop(GLIBC_2.0) [1]        | pthread_cond_broadcast(GLIBC_2.3.2) [2]  | pthread_join(GLIBC_2.0) [2]          | pthread_rwlock_destroy(GLIBC_2.1) [2]     | pthread_setconcurrency(GLIBC_2.1) [2] |
| _pthread_cleanup_push(GLIBC_2.0) [1]       | pthread_cond_destroy(GLIBC_2.3.2) [2]    | pthread_key_create(GLIBC_2.0) [2]    | pthread_rwlock_init(GLIBC_2.1) [2]        | pthread_setspecific(GLIBC_2.0) [2]    |
| pthread_attr_destroy(GLIBC_2.0) [2]        | pthread_cond_init(GLIBC_2.3.2) [2]       | pthread_key_delete(GLIBC_2.0) [2]    | pthread_rwlock_rdlock(GLIBC_2.1) [2]      | pthread_sigmask(GLIBC_2.0) [2]        |
| pthread_attr_getdetachstate(GLIBC_2.0) [2] | pthread_cond_signal(GLIBC_2.3.2) [2]     | pthread_kill(GLIBC_2.0) [2]          | pthread_rwlock_timedrdlock(GLIBC_2.2) [2] | pthread_testcancel(GLIBC_2.0) [2]     |
| pthread_attr_getguardsize(GLIBC_2.1) [2]   | pthread_cond_timedwait(GLIBC_2.3.2) [2]  | pthread_mutex_destroy(GLIBC_2.0) [2] | pthread_rwlock_timedwrlock(GLIBC_2.2) [2] | sem_close(GLIBC_2.1.1) [2]            |
| pthread_attr_getschedparam(GLIBC_2.0) [2]  | pthread_cond_wait(GLIBC_2.3.2) [2]       | pthread_mutex_init(GLIBC_2.0) [2]    | pthread_rwlock_tryrdlock(GLIBC_2.1) [2]   | sem_destroy(GLIBC_2.1) [2]            |
| pthread_attr_getstack(GLIBC_2.2) [2]       | pthread_cond_attr_destroy(GLIBC_2.0) [2] | pthread_mutex_lock(GLIBC_2.0) [2]    | pthread_rwlock_trywrlock(GLIBC_2.1) [2]   | sem_getvalue(GLIBC_2.1) [2]           |
| pthread_attr_                              | pthread_cond                             | pthread_mutex                        | pthread_rwlock                            | sem_init(GLI                          |

|  |  |   |  |                              |
|--|--|---|--|------------------------------|
| getstackaddr(GLIBC_2.1) [2]                | attr_getpshared(GLIBC_2.2) [2]             | x_trylock(GLIBC_2.0) [2]                    | ck_unlock(GLIBC_2.1) [2]                     | BC_2.1) [2]                  |
| pthread_attr_getstacksize(GLIBC_2.1) [2]   | pthread_condattr_init(GLIBC_2.0) [2]       | pthread_mutex_unlock(GLIBC_2.0) [2]         | pthread_rwlock_wrlock(GLIBC_2.1) [2]         | sem_open(GLIBC_2.1.1) [2]    |
| pthread_attr_init(GLIBC_2.1) [2]           | pthread_condattr_setpshared(GLIBC_2.2) [2] | pthread_mutexattr_destroy(GLIBC_2.0) [2]    | pthread_rwlockattr_destroy(GLIBC_2.1) [2]    | sem_post(GLIBC_2.1) [2]      |
| pthread_attr_setdetachstate(GLIBC_2.0) [2] | pthread_create(GLIBC_2.1) [2]              | pthread_mutexattr_getpshared(GLIBC_2.2) [2] | pthread_rwlockattr_getpshared(GLIBC_2.1) [2] | sem_timedwait(GLIBC_2.2) [2] |
| pthread_attr_setguardsize(GLIBC_2.1) [2]   | pthread_detach(GLIBC_2.0) [2]              | pthread_mutexattr_gettype(GLIBC_2.1) [2]    | pthread_rwlockattr_init(GLIBC_2.1) [2]       | sem_trywait(GLIBC_2.1) [2]   |
| pthread_attr_setschedparam(GLIBC_2.0) [2]  | pthread_equal(GLIBC_2.0) [2]               | pthread_mutexattr_init(GLIBC_2.0) [2]       | pthread_rwlockattr_setpshared(GLIBC_2.1) [2] | sem_unlink(GLIBC_2.1.1) [2]  |
| pthread_attr_setstackaddr(GLIBC_2.1) [2]   | pthread_exit(GLIBC_2.0) [2]                | pthread_mutexattr_setpshared(GLIBC_2.2) [2] | pthread_self(GLIBC_2.0) [2]                  | sem_wait(GLIBC_2.1) [2]      |
| pthread_attr_setstacksize(GLIBC_2.1) [2]   | pthread_getconcurrency(GLIBC_2.1) [2]      | pthread_mutexattr_settype(GLIBC_2.1) [2]    | pthread_setcancelstate(GLIBC_2.0) [2]        |                              |
| pthread_cancel(GLIBC_2.0) [2]              | pthread_getspecific(GLIBC_2.0) [2]         | pthread_once(GLIBC_2.0) [2]                 | pthread_setcanceltype(GLIBC_2.0) [2]         |                              |

Referenced Specification(s)

[1]. this specification

[2]. ISO POSIX (2003)

## 11.6.4 Thread aware versions of libc interfaces

### 11.6.4.1 Interfaces for Thread aware versions of libc interfaces

An LSB conforming implementation shall provide the architecture specific functions for Thread aware versions of libc interfaces specified in Table 11-30, with the full mandatory functionality as described in the referenced underlying specification.

**Table 11-30 libpthread - Thread aware versions of libc interfaces Function Interfaces**

|                             |                             |                             |  |  |
|-----------------------------|-----------------------------|-----------------------------|--|--|
| lseek64(GLIBC<br>C_2.2) [1] | pread(GLIBC<br>_2.2) [2]    | pwrite(GLIBC<br>_2.2) [2]   |  |  |
| open64(GLIBC<br>C_2.2) [1]  | pread64(GLIBC<br>C_2.2) [1] | pwrite64(GLI<br>BC_2.2) [1] |  |  |

Referenced Specification(s)

[1]. Large File Support

[2]. ISO POSIX (2003)

## 11.7 Interfaces for libgcc\_s

Table 11-31 defines the library name and shared object name for the libgcc\_s library

**Table 11-31 libgcc\_s Definition**

|          |               |
|----------|---------------|
| Library: | libgcc_s      |
| SONAME:  | libgcc_s.so.1 |

The behavior of the interfaces in this library is specified by the following specifications:

this specification

### 11.7.1 Unwind Library

#### 11.7.1.1 Interfaces for Unwind Library

An LSB conforming implementation shall provide the architecture specific functions for Unwind Library specified in Table 11-32, with the full mandatory functionality as described in the referenced underlying specification.

**Table 11-32 libgcc\_s - Unwind Library Function Interfaces**

|  |                                     |  |  |                            |
|--|-------------------------------------|--|--|----------------------------|
| _Unwind_Backtrace(GCC_3.3) [1]             | _Unwind_ForkedUnwind(GCC_3.0) [1]   | _Unwind_GetIP(GCC_3.0) [1]                   | _Unwind_RaiseException(GCC_3.0) [1]    | _Unwind_SetIP(GCC_3.0) [1] |
| _Unwind_DeleteException(GCC_3.0) [1]       | _Unwind_GetCFA(GCC_3.3) [1]         | _Unwind_GetLanguageSpecificData(GCC_3.0) [1] | _Unwind_Resume(GCC_3.0) [1]            |                            |
| _Unwind_FindEnclosingFunction(GCC_3.3) [1] | _Unwind_GetDataRelBase(GCC_3.0) [1] | _Unwind_GetRegionStart(GCC_3.0) [1]          | _Unwind_Resume_or_Rethrow(GCC_3.3) [1] |                            |
| _Unwind_Find_FDE(GCC_3.0) [1]              | _Unwind_GetGR(GCC_3.0) [1]          | _Unwind_GetTextRelBase(GCC_3.0) [1]          | _Unwind_SetGR(GCC_3.0) [1]             |                            |

Referenced Specification(s)

[1]. this specification

## 11.8 Interface Definitions for libgcc\_s

The following interfaces are included in libgcc\_s and are defined by this specification. Unless otherwise noted, these interfaces shall be included in the source standard.

Other interfaces listed above for libgcc\_s shall behave as described in the referenced base document.

## 11.9 Interfaces for libdl

Table 11-33 defines the library name and shared object name for the libdl library

**Table 11-33 libdl Definition**

|          |            |
|----------|------------|
| Library: | libdl      |
| SONAME:  | libdl.so.2 |

The behavior of the interfaces in this library is specified by the following specifications:

this specification  
ISO POSIX (2003)

### 11.9.1 Dynamic Loader

#### 11.9.1.1 Interfaces for Dynamic Loader

An LSB conforming implementation shall provide the architecture specific functions for Dynamic Loader specified in Table 11-34, with the full mandatory functionality as described in the referenced underlying specification.

**Table 11-34 libdl - Dynamic Loader Function Interfaces**

|                        |                         |                         |                        |                       |
|------------------------|-------------------------|-------------------------|------------------------|-----------------------|
| dladdr(GLIB C_2.0) [1] | dlclose(GLIB C_2.0) [2] | dLError(GLIB C_2.0) [2] | dlopen(GLIB C_2.1) [1] | dlsym(GLIBC _2.0) [1] |
|------------------------|-------------------------|-------------------------|------------------------|-----------------------|

*Referenced Specification(s)*

[1]. this specification  
[2]. ISO POSIX (2003)

## 11.10 Interfaces for libcrypt

Table 11-35 defines the library name and shared object name for the libcrypt library

**Table 11-35 libcrypt Definition**

|          |               |
|----------|---------------|
| Library: | libcrypt      |
| SONAME:  | libcrypt.so.1 |

The behavior of the interfaces in this library is specified by the following specifications:

ISO POSIX (2003)

## 11.10.1 Encryption

### 11.10.1.1 Interfaces for Encryption

An LSB conforming implementation shall provide the architecture specific functions for Encryption specified in Table 11-36, with the full mandatory functionality as described in the referenced underlying specification.

**Table 11-36 libcrypt - Encryption Function Interfaces**

|                      |                        |                       |  |  |
|----------------------|------------------------|-----------------------|--|--|
| crypt(GLIBC_2.0) [1] | encrypt(GLIBC_2.0) [1] | setkey(GLIBC_2.0) [1] |  |  |
|----------------------|------------------------|-----------------------|--|--|

*Referenced Specification(s)*

[1]. ISO POSIX (2003)

## 12 Libraries

An LSB-conforming implementation shall also support some utility libraries which are built on top of the interfaces provided by the base libraries. These libraries implement common functionality, and hide additional system dependent information such as file formats and device names.

### 12.1 Interfaces for libz

Table 12-1 defines the library name and shared object name for the libz library

**Table 12-1 libz Definition**

|          |           |
|----------|-----------|
| Library: | libz      |
| SONAME:  | libz.so.1 |

#### 12.1.1 Compression Library

##### 12.1.1.1 Interfaces for Compression Library

No external functions are defined for libz - Compression Library

### 12.2 Interfaces for libncurses

Table 12-2 defines the library name and shared object name for the libncurses library

**Table 12-2 libncurses Definition**

|          |                 |
|----------|-----------------|
| Library: | libncurses      |
| SONAME:  | libncurses.so.5 |

#### 12.2.1 Curses

##### 12.2.1.1 Interfaces for Curses

No external functions are defined for libncurses - Curses

### 12.3 Interfaces for libutil

Table 12-3 defines the library name and shared object name for the libutil library

**Table 12-3 libutil Definition**

|          |              |
|----------|--------------|
| Library: | libutil      |
| SONAME:  | libutil.so.1 |

The behavior of the interfaces in this library is specified by the following specifications:

this specification



## 12.3.1 Utility Functions

### 12.3.1.1 Interfaces for Utility Functions

An LSB conforming implementation shall provide the architecture specific functions for Utility Functions specified in Table 12-4, with the full mandatory functionality as described in the referenced underlying specification.

**Table 12-4 libutil - Utility Functions Function Interfaces**

|                         |                          |                        |  |  |
|-------------------------|--------------------------|------------------------|--|--|
| forkpty(GLIB C_2.0) [1] | login_tty(GLIBC_2.0) [1] | logwtmp(GLIBC_2.0) [1] |  |  |
| login(GLIBC_2.0) [1]    | logout(GLIBC_2.0) [1]    | openpty(GLIBC_2.0) [1] |  |  |

*Referenced Specification(s)*

[1]. this specification

## 13 Software Installation

### 13.1 Package Dependencies

The LSB runtime environment shall provide the following dependencies.

`lsb-core-ppc32`

This dependency is used to indicate that the application is dependent on features contained in the LSB-Core specification.

These dependencies shall have a version of 3.0.

Other LSB modules may add additional dependencies; such dependencies shall have the format `lsb-module-ppc32`.

### 13.2 Package Architecture Considerations

All packages must specify an architecture of `ppc`. A LSB runtime environment must accept an architecture of `ppc` even if the native architecture is different.

The `archnum` value in the Lead Section shall be `0x0005`.

# Annex A Alphabetical Listing of Interfaces

## A.1 libgcc\_s

The behavior of the interfaces in this library is specified by the following Standards.  
this specification

**Table A-1 libgcc\_s Function Interfaces**

|                                  |                                    |                              |
|----------------------------------|------------------------------------|------------------------------|
| _Unwind_Backtrace[1]             | _Unwind_GetDataRelBase[1]          | _Unwind_RaiseException[1]    |
| _Unwind_DeleteException[1]       | _Unwind_GetGR[1]                   | _Unwind_Resume[1]            |
| _Unwind_FindEnclosingFunction[1] | _Unwind_GetIP[1]                   | _Unwind_Resume_or_Rethrow[1] |
| _Unwind_Find_FDE[1]              | _Unwind_GetLanguageSpecificData[1] | _Unwind_SetGR[1]             |
| _Unwind_ForcedUnwind[1]          | _Unwind_GetRegionStart[1]          | _Unwind_SetIP[1]             |
| _Unwind_GetCFA[1]                | _Unwind_GetTextRelBase[1]          |                              |

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