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intel ®

May 1995

Dear Paragon™ System Basic Math Library Customer:

This package contains the Paragon™ System Basic Math Library Software. Please read through the documentation and distribute it to anyone intending to use the system.

Before using your Paragon System Basic Math Library Software:

- **Read this letter completely.**

- **Verify the contents of this package.**

- **Read the *Paragon™ System Basic Math Library Software Release 5.0 Release Notes*.**

Package Contents

Table 1 lists the installation media, and Table 2 lists the accompanying documentation. Please verify that your software package includes these items.

Table 1. Installation Media

Description	Order Number
Cartridge tape labeled "Paragon™ System Basic Math Library Release 5.0"	635164-001 ✓

Table 2. Documentation

Description	Order Number
CLASSPACK Basic Math Library Reference Manual for Fortran & C	635095-001

If items are missing, or if you have any questions, please contact Intel Scalable Systems Division immediately. Please refer to the section "Comments and Assistance" in this letter for information about how to contact Intel Scalable Systems Division.

What is in Release 5.0?

The Basic Math Library contains highly optimized versions of standard computational building blocks that you can use to improve the performance of your numerical application programs.The Basic Math Library is callable from both Fortran and C.

This version of the Basic Math Library supports both single-precision real and single-precision complex data types.

On MP systems, the Basic Math Library calls are executed in parallel on a compute node. When you execute a Basic Math Library call, a process is created on the other processor on the node board, and the two processes share the work.

Installation

For directions on how to install the Paragon System Basic Math Library software, refer to Chapter 2 of the *Paragon*™ *System Basic Math Library Software Release 5.0 Release Notes*.

Comments and Assistance

We are eager to hear of your experiences with our new software product. Please call us if you need assistance, have questions, or otherwise want to comment on your Paragon System Basic Math Library Software.

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If you have comments about our manuals, please fill out and mail the enclosed Comment Card. You can also send your comments electronically to the following address:

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Intel Supercomputer Users' Group

The Intel Supercomputer Users Group promotes the exchange of information among users. Intel strongly supports the Users Group and encourages participation in its activities, which include: Special Interest Groups (SIGs), an annual international users conference, an electronic mail task force, and a "freeware" library of user-contributed software, available electronically to all members of the Intel Supercomputer Users' Group. For membership information contact:

JoAnne Wold (503-677-5322)
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Sincerely,

Peter Wolochow

Product Marketing Manager
Intel Scalable Systems Division

Paragon™ System Basic Math

Library Software

Release 5.0

Release Notes

Intel® Corporation

286	i386	Intel	iPSC
287	i387	Intel386	Paragon
i	i486	Intel387	
	i487	Intel486	
	i860	Intel487	

WARNING

Some of the circuitry inside this system operates at hazardous energy and electric shock voltage levels. To avoid the risk of personal injury due to contact with an energy hazard, or risk of electric shock, do not enter any portion of this system unless it is intended to be accessible without the use of a tool. The areas that are considered accessible are the outer enclosure and the area just inside the front door when all of the front panels are installed, and the front of the diagnostic station. There are no user serviceable areas inside the system. Refer any need for such access only to technical personnel that have been qualified by Intel Corporation.

CAUTION

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

LIMITED RIGHTS

Preface

These release notes provide the latest information on features, limitations, workarounds, and installation for the Paragon™ System Basic Math Library for Paragon systems.

These release notes assume that you are an application programmer, familiar with the C or Fortran language and the UNIX operating system.

Organization

Chapter 1	Describes the features, limitations and restrictions of the Paragon System Basic Math Library.
Chapter 2	Provides software installation information.
Chaper 3	Provides bug lists for the Paragon System Basic Math Library.

Notational Conventions

This manual uses the following notational conventions:

Bold	Identifies command names and switches, system call names, reserved words, and other items that must be used exactly as shown.
Italic	Identifies variables, filenames, directories, processes, user names, and writer annotations in examples. Italic type style is also occasionally used to emphasize a word or phrase.

Plain-Monospace

> Identifies computer output (prompts and messages), examples, and values of variables. Some examples contain annotations that describe specific parts of the example. These annotations (which are not part of the example code or session) appear in *italic* type style and flush with the right margin.

Bold-Italic-Monospace

> Identifies user input (what you enter in response to some prompt).

Bold-Monospace

> Identifies the names of keyboard keys (which are also enclosed in angle brackets). A dash indicates that the key preceding the dash is to be held down *while* the key following the dash is pressed. For example:

> **<Break>**   **<s>**   **<Ctrl-Alt-Del>**

[   ]   (Brackets) Surround optional items.

. . .   (Ellipsis dots) Indicate that the preceding item may be repeated.

| (Bar) Separates two or more items of which you may select only one.

{   }   (Braces) Surround two or more items of which you must select one.

Comments and Assistance

Intel Scalable Systems Division is eager to hear of your experiences with our new software product. Please call us if you need assistance, have questions, or otherwise want to comment on your Paragon system.

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Product Features 1

Introduction

The Basic Math Library contains highly optimized versions of standard computational building blocks that you can use to improve the performance of your numerical application programs.The Basic Math Library is callable from both Fortran and C.

This version of the Basic Math Library supports both single-precision real and single-precision complex data types.

On MP systems, the Basic Math Library calls are executed in parallel on a compute node. When you execute a Basic Math Library call, a process is created on the other processor on the node board, and the two processes share the work.

Using the Basic Math Library

This section lists some specifics about using the Basic Math Library.

Compiler Switches

If you are not explicitly coding your own pthreads, specify **-Mconcur** at both compilation and link steps and specify **-lkmath** at the link step. If you are explicitly coding your own pthreads, do not use **-Mconcur**.

Reentrant Library

A reentrant version of the Basic Math Library is provided. The reentrant version is *libkmath_r.a*. This reentrant version is automatically linked in when you specify **-Mconcur**.and **-lkmath** switches when linking. If you do not use **-Mconcur**, you must explicitly specify *-lkmath_r*.

C Programming

When linking an application written in C, you should also provide the **-lf** and **-lm** switches on the command line.

In addition, for C applications, the complex data type used in this library is defined as:

```
typedef struct{float r,i,} complex;
```

This datatype must be defined in the program to produce correct results when using Basic Math Library routines. This can be accomplished by using an *#include kai_c.h* statement at the beginning of the program, or by defining its type as shown above.

SMP Programming

The symmetric multiprocessing programming (SMP) model is supported for both MP and GP systems. SMP programs are multi-pthreaded programs that run on one or more processors. For information about SMP programming, refer to the *Paragon™ System User's Guide*.

A key feature of SMP programming is the parallelization of loops. If you parallelize a loop that contains a Basic Math Library call, correct answers still result; but, depending on the particular routine and application, slower processing may result.

Software Installation 2

Introduction

This chapter describes how to install the Paragon System Basic Math Library Software. Please read through this chapter completely before installing the software.

If you have any questions, please contact SSD Customer Service. See "Comments and Assistance" on page vi of the Preface.

CAUTION

Before you install the Paragon System Basic Math Library Software, you *must* install Release 1.3, or later, of the Paragon System Software.

Installation

Installation Time:	Approximately 10 minutes.
Installation Medium:	One cartridge tape, labeled "Paragon(TM) System Basic Math Library Release 5.0 (635164-001)."
Information you need:	*root* password.
Disk space you need:	7 MB for libraries; 1 MB for online documentation

1.   Log into the diagnostic station as *root*.

NOTE

Make sure no one but yourself (*root*) is logged on to the system
before or while you are doing the installation.

2.   Make */u/tmp* your working directory.

3.   Insert the release tape into the cartridge tape drive on the diagnostic station.

4.   Issue the command,

```
DS# tar xvf /dev/rStp0
```

5.   After the tape has been copied, remove the tape from the cartridge tape drive.

6.   Transfer the library files to the directory */usr/ccs/lib* on the Paragon system.

```
DS# ftp Paragon_network_name
Connected to Paragon_network_name.
220 Paragon_network_name FTP server (OSF/1 Version ?.??) ready.
Name (Paragon_network_name:user): root
331 Password required for root.
Password:  Password
ftp> bin
ftp> cd  /usr/ccs/lib
ftp> put libkmath.a
ftp> put libkmath_r.a
ftp>
```

7.   Transfer the online documentation.

```
ftp> cd /usr/share
ftp> put bml.doc.tar.Z
ftp> quit
```

8.   Log into the Paragon system as *root*.

```
DS# rlogin Paragon_network_name
Password: Password
#
```

9. Create links between the library files in */usr/ccs/lib* to files in */usr/lib*. These links may already exist. If they do, you will get an error message that you can ignore.

```
# ln -s /usr/ccs/lib/libkmath.a /usr/lib/libkmath.a
# ln -s /usr/ccs/lib/libkmath_r.a /usr/lib/libkmath_r.a
```

10. Extract the online documentation as follows:

```
# cd /usr/share
# zcat bml.doc.tar.Z | tar xvpf -
```

The directory */usr/share* is the standard location for online manual pages, and after installation they are accessible with the **man** command.

11. At this point you no longer need the file *bml.doc.tar.Z*, and you may remove it if you wish to conserve disk space.

12. Incorporate the *whatis* file for the Basic Math Library with an existing *whatis* file.

```
# cd /usr/share/man
# cp whatis whatis.orig
# cat whatis whatis.bml | sort > whatis.tmp
# mv whatis.tmp whatis
```

13. To install the Paragon System Basic Math Library Software and online documentation on a cross-development system, log into the cross-development system as *root* and execute the following commands:

```
CROSS# cd $PARAGON_XDEV/paragon/lib-coff
CROSS# ftp -i diagnostic_station_network_name
Connected to diagnostic_station_network_name
220 diagnostic_station_network_name FTP server (Version 5.60 #1)
ready.
331 Password required for root.
Password: Password
ftp> bin
ftp> cd /u/tmp
ftp> mget libkmath*
ftp> lcd /tmp
ftp> get bml.doc.tar.Z
ftp> bye
CROSS# chmod 644 libkmath*.a
CROSS# cd $PARAGON_XDEV/paragon
CROSS# zcat /tmp/bml.doc.tar.Z | tar xfp -
CROSS# rm /tmp/bml.doc.tar.Z
```

14. If you install the online documentation on a Sun cross-development system, you must add the *man* directory to your MANPATH. For example, if you install the online documentation in *$PARAGON_XDEV*, you must add *$PARAGON_XDEV/man* to your MANPATH definition. For example, the appropriate line in *.login* may appear as follows.

```
setenv MANPATH "/usr/man:/vol/local/man:$PARAGON_XDEV/man:/vol/local/`arc
h`/X11R5/man"
```

In addition, you may wish to **cat** *whatis.bml* to your existing *whatis* and **sort**.

Bug Lists for the Basic Math Library   3

Introduction

This chapter contains a list of open bugs and a list of fixed bugs. These lists are updated just before shipment and are also available online in the files */usr/share/release_notes/bml_buglist* and */usr/share/release_notes/bml_fixed* on the Paragon system.

The open bug list lists the open bugs logged against the Basic Math Library software. The open bug list is organized in alphabetical order by subsystem name. The bug list includes the following:

* Bug number

* Subsystem name

* Bug synopsis

* Bug description (when available)

The fixed bug list lists the bugs fixed since the last release of the Basic Math Library software. These fixes are part of the current release. The fixed bug list is organized in numerical order by bug number. The bug listing includes the following:

* Bug number

* Subsystem name

* Bug synopsis

The fixed bug list was generated on 2/10/95.

Open Bug List

The following lists the open bugs for Release 5.0 of the Basic Math Library.

12396 LIBKMATH   Error in libkmath.a in SGEMM for m=5, n=8, k=15.

12397 LIBKMATH   Five complex*8 blas3 routines in libkmath_r.a
                                   leave dirty KI reg.

Fixed Bug List

The following lists the bugs fixed since the last release of the Basic Math Library.

10727 LIBKMATH   fft SAT dumps core reliably

11627 LIBKMATH   libkmath has been improved.

11660 LIBKMATH   Many libkmath routines return dirty KR, KI, and T
                                   registers.