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Fujitsu Technology Solutions GmbH

PLI1 (BS2000) V4.2A

*1   Edition: May 2009

R E L E A S E   N O T I C E

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1   GENERAL

The PL/I compiler PLI1 was specially designed for BS2000 *). Its features include both the ISO 6160 standard (corresponding to ANSI X3.53-1976/ECMA-50/ DIN 66255) and - with minor restrictions - the functions of the PL/I optimizing compiler.

Version 4.2A of the PLI1 compiler and its runtime system have been adapted to LMS V2.0 and BS2000 V11.

This release notice is a summary of the major requirements and operating information for the PL/I compiler PLI1 V4.2A under the BS2000 operating system

*1   The release level is that of November 2006.

Customers will receive an updated version of this file should any subsequent changes be made. Print the file by means of the following command:

/PRINT SYSFGM PLI1.042.D,SPACE=E (German)

or

/PRINT SYSFGM PLI1.042.E,SPACE=E (English)

*1   This Release Notice is also available online under
*1   http://manuals.ts.fujitsu.com

1.1   Ordering

PLI1 V4.2A can be ordered from your local distributors.

1.2   Delivery

PLI1 V4.2A files are delivered via SOLIS.

The current file and volume characteristics are listed in the SOLIS2 delivery cover letter.

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*) BS2000 is a registered trademark of
   Fujitsu Technology Solutions GmbH

Delivery components:

PLI1	Compiler (starter)
PLI1.TEXT.D	Text file (German)
PLI1.TEXT.E	Text file (English)
SYSLNK.PLI1.042.COMP	Load module library for compiler
PLI1.MODLIB.SHARE	Dynamic runtime system
PLI1.MODLIB	Static runtime system
PLI1.MODLIB.UTM	UTM connection module for NXS
PLI1.MODLIB.UTM.XS	UTM connection module for XS
PLI1.MACLIB	Macro library
SYSFGM.PLI1.042.D	Release notice (German)
SYSFGM.PLI1.042.E	Release notice (English)
SYSRME.PLI1.042.D	Readme file (German)
SYSRME.PLI1.042.E	Readme file (English)
SYSSII.PLI1.042	Installation file for compiler
SYSSII.PLI1-LZS.042	Installation file for runtime system
SYSSSD.PLI1.042.CL4	Subsystem declaration for runtime system
SYSSSD.PLI1.042.CL5	Subsystem declaration for runtime system
SYSSSD.PLI1.042.CL6	Subsystem declaration for runtime system
SYSSSD.PLI1.042.CL4COMP	Subsystem declaration for compiler
SYSSSD.PLI1.042.CL5COMP	Subsystem declaration for compiler
SYSSSD.PLI1.042.CL6COMP	Subsystem declaration for compiler
SYSSDF.PLI1.042	SDF syntax file
SYSSDF.PLI1.042.USER	SDF user syntax file
SYSSPR.PLI1.042.COMPILE	SDF procedure
SYSSPR.PLI1.042.EXECUTE	SDF procedure

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1.3   Documentation

The following manuals belong to the PLI1 V4.2A product:

Title	Order no.	Level
PLI1 (BS2000)	U1909-J-Z125-5	5.91

PL/I-Compiler Beschreibung	!	! PLI1 V4.1A
PLI1 (BS2000) PL/I Compiler Reference Manual	! U1909-J-Z55-1-7600	! 12.90 ! PLI1 V4.0C
PLI1 (BS2000) PL/I-Compiler Benutzerhandbuch	! U253-J-Z125-9	! 5.91 ! PLI1 V4.1A
PLI1 (BS2000) PL/I Compiler User Guide	! U253-J-Z125-8-7600	! 5.91 ! PLI1 V4.1A
PLI1 (BS2000) PL/I-Compiler Taschenbuch	! U505-J1-Z55-6	! 10.88 ! Nachtrag ! zu V4.0A
PLI1 (BS2000) PL/I Compiler Reference Guide	! U505-J1-Z55-6-7600	! 10.88 ! Supplement ! for V4.0A

Note:

The PLI1 V4.2A software extensions are described
in chapter 3.

The following documentation is also recommended:

Title	! Order no.	! Level
UTM, UTM D Ergaenzung fuer PL/I Benutzerhandbuch	! U5431-J-Z125-2	! 6.91 ! UTM V3.2A ! UTM D V1.2A
UTM, UTM D Supplement for PL/I User Guide	! U5431-J-Z125-2-7600!	! 6.91 ! UTM V3.2A ! UTM D V1.2A
AID (BS2000) Testen von PL/I- Programmen Benutzerhandbuch	! U3484-J-Z125-3	! 3.92 ! AID V2.0A
AID (BS2000) User Guide	! U3484-J-Z125-3-7600!	! 3.92 ! AID V2.0A

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2   TECHNICAL INFORMATION

2.1   Resource requirements

The PLI1 compiler requires no more than the usual
BS2000 hardware equipment. However, it needs a very
large virtual address space (see below), so you
should use memory sizes of 2 Mbytes or more.

The PLI1 compiler including the precompiler uses ap-
proximately 750 PAM pages (storage), the static runtime

system approximately 300 PAM pages, and the prelinked runtime system 200 PAM pages.

During compilation, the compiler occupies a virtual address space of approximately 1.3 Mbytes, depending on the size of the program. A virtual user address space of at least 2 Mbytes is required.

For the storage sizes of object programs, the decisive factor is whether you link "statically" (PLI1.MODLIB) or "dynamically" (PLI1.MODLIB.SHARE), i.e. whether the runtime system is linked permanently or reloaded dynamically at runtime.

2.2 Software configuration

PLI1 V4.2A is loadable under the operating system BS2000 as of V11.0 (BS2000/OSD-BC V1.0).

When using the PL/I - FORTRAN language interface, you need the FOR1 compiler, V2.0 or above.

For language interfacing via ILCS interface, you need ILCS >= V1.4.

To link XS programs, you must have TSOSLNK >= V21.0C.

When using the PLAM access method for object code output to LMS libraries, subsequent linkage requires TSOSLNK >= V18 and/or LMS >= V1.1.

LMS/PLAM >= V2.0 is required for version specifications as described in section 3.1.

The UTM interface requires UTM >= V3.0.

Generally, PLI1 V4.2A is upward compatible, which means that the PLI1 V4.2A runtime system normally supports objects processed by compiler versions >= V3.0 (see earlier release notices where applicable). However, NXS and XS objects cannot be merged.

Using the symbolic debugger, AID, requires AID >= V1.0C.

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2.3 Product installation

Standard installation is via SOLIS. PLI1 is installed by default under the $TSOS user ID. You are advised to proceed as follows:

- Use LMR or LMS to merge the PLI1.MODLIB.SHARE runtime library into the system TASKLIB.

- Delete module library PLI1.MODLIB unless you wish to link statically - statically linked PL/I object programs need considerably more PAM pages (approximately 35-80 pages).

- The prelinked PLI1 runtime system can be loaded shareably by the system administrator using the following command:

```
/SHARE (ITP#IOS#,ITP#RTS#)[,[$<userid>.]
  PLI1.MODLIB.SHARE]
```

It is possible to use DSSM instead of the SHARE
command. The names of the declaration files are:

```
SYSSSD.PLI1.042.CL4 (class 4 memory)
SYSSSD.PLI1.042.CL5 (class 5 memory)
SYSSSD.PLI1.042.CL6 (class 6 memory)
```

It is possible to use DSSM also for the compiler.
The names of the declaration files are:

```
SYSSSD.PLI1.042.CL4COMP (class 4 memory)
SYSSSD.PLI1.042.CL5COMP (class 5 memory)
SYSSSD.PLI1.042.CL6COMP (class 6 memory)
```

As of BS2000/OSD V3.0 the installation is done
by the command   /START-IMON
into the default userid $. (in general equal to $TSOS.).
Then the subsystems are generated automatically.

2.4   Product use

The User Guide specified in section 1.3 describes the
procedure for calling the compiler, linking the pro-
grams, and calling the programs on the assumption that
the compiler and error text files are installed in the
system catalog.

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The library with the object modules of the runtime system
has to be be defined as the TASKLIB. Only one runtime system
system library (PLI1.MODLIB or PLI1.MODLIB.SHARE) may be
defined as the TASKLIB.

If different file names are used, or if the files
are not entered under $. for trial runs, then the
following customizations may be necessary:

- Before calling the compiler or the program, the text
  file must be assigned using the LINK name TEXTLINK
  (e.g. /FILE $<userid>.PLI1.TEXT.E,LINK=TEXTLINK).

- Linkage editor statement RESOLVE must be specified
  (e.g. RESOLVE ,$<userid>.PLI1.MODLIB[.SHARE]).

- When linking programs with ILCS language mix, the
  necessary ILCS modules must be linked from the
  SYSLNK.ILCS library or SYSLNK.CRTE library respectively.

- The library for the dynamically reloadable runtime
  system must be assigned via /SYSFILE TASKLIB (e.g.
  /SYSFILE TASKLIB=$<userid>.PLI1.MODLIB.SHARE).

Note:

TASKLIB assignment is ignored when a shareable run-
time system is used. If, for a transitional period,
you wish to use two different runtime system ver-
sions, both must be declared "non-shareable".

In this case one version must always be linked permanently.
If the user makes any mistake here, the following
message appears:

"INCONSISTENT RUNTIME-IO-SYSTEM"

- Macro library PLI1.MACLIB must be installed in those
  cases where the user writes Assembler programs which
  are either to be called by PLI1 or are to call PLI1
  programs themselves. This library also contains the
  "LWKAP" macro, which is needed to generate UTM
  applications (with PLI1 program units). In this
  case, the macro library must be announced to the
  Assembler.

- Library PLI1.MODLIB.UTM (or module UTMPLI1) should
  not be merged into PLI1.MODLIB[.SHARE] since ex-
  ternal references with identical names might be
  resolved incorrectly.

- For a PLI1 application without a PLI1 main program
  there is recommended to use the macro P$ENVIRM only
  for one assembler program as otherwise the entry
  P$START# is generated more than once.

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2.5 Eliminated functions

The installation into another userid
as the default userid $. is no longer supported.
The procedure PLI1.DO.PRIVAT is no longer a delivery part.
Any existing delivery parts of a previous delivery
of the version V4.2 in private userids have to be erased.

2.6 Incompatibilities

2.7 Restrictions

Programs using language transfer cannot be started with
the DLL ("/EXEC *" not possible in this case).

The laser printer can be used; however, line overprint
with SKIP(0) or control characters '+' or X'00', '00'B4
in PL/I notation, is either restricted (overprint once)
or not supported at all (for certain character sets).

Files larger or equal 32 GB (as introduced with OSD/V5)
are not supported within the PLI1 system
Any access on such a file may lead to an uncontrolled
behaviour.

2.8 Procedure in the event of errors

For any errors in PLI1, the following documentation should be prepared and sent to the service department responsible for PLI1:

- If the error occurs during compilation:

  Source (on paper if less than 50 lines, otherwise on magnetic tape), list of options, include files/ libraries used.

- In the event of a runtime error:

  Source (on paper if less than 50 lines, otherwise on magnetic tape), list of options, include files/ libraries used, linkage editor listing, input/output data, runtime log.

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3 SOFTWARE EXTENSIONS

This chapter only describes the extensions and changes compared to PLI1 V4.1A.

3.1 Adaptation to LMS V2.0

PLI1 supports the new LMS/PLAM V2.0 control options, allowing the user to reference the highest possible version, the highest existing version and the next highest version of an LMS library element. This control can be obtained as follows:

ISP command:

```
/EXEC PLI1
                                      {version           }
*COMOPT SOURCE=(library(element({*HIGHEST-EXISTING}))),
                                      {*UPPER-LIMIT      }

                                      {version           }
*COMOPT MODULE=(library(element({*HIGHEST-EXISTING})))
                                      {*UPPER-LIMIT      }
                                      {*INCREMENT        }
```

SDF command:

```
/START-PLI1-COMPILER
SOURCE=*LIBRARY-ELEMENT
       (LIBRARY=library,
               ELEMENT=element
                        {version           }
               (VERSION={*HIGHEST-EXISTING})),
```

```
                              {*UPPER-LIMIT      }
MODULE-LIBRARY=library
                (ELEMENT=element
                            {version           }
                (VERSION={*HIGHEST-EXISTING}))
                              {*UPPER-LIMIT      }
                              {*INCREMENT        }
```

where

```
library             = library name
element             = library element name
version             = element version
*UPPER-LIMIT        = highest possible version
*HIGHEST-EXISTING   = highest existing version
*INCREMENT          = next highest version
```

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3.2   Four-digit year specification

In future, the year displayed in dates will be repre-
sented by four digits: two for the year and two for the
century. This four-digit date will be displayed in the
header line of the compiler listing.

There is a new built-in function called DATETIME for
calls in user programs. The DATETIME[()] function
produces a string of 17 characters, representing the
current date with a four-digit year and the time at
which the function was called up:

CCYYMMDDhhmmssttt

where

```
CC  = Century (2 characters)
YY  = Year (2 characters)
MM  = Month (2 characters)
DD  = Day (2 characters)
hh  = Hour (2 characters)
mm  = Minutes (2 characters)
ss  = Seconds (2 characters)
ttt = Milliseconds (3 characters) , set to 000
```

3.3   Adaptation to BS2000 V11

BS2000 >= V11 supports 4K-structured disk files. The
smallest unit that can be referenced in 4K-structured
disk files is 4 Kbytes as opposed to the previous stan-
dard of 2 Kbytes. In the case of 4K-structured SAM and
ISAM files, this means that when the PLI1 file struc-
ture type CONSECUTIVE is used, the data processing sys-
tem assigns space for the PAM key in each block; this
space is then no longer available to the user. RECSIZE
can thus become no larger than BLKSIZE-16.

For CONSECUTIVE file structuring on 4K-structured PAM
files, the smallest transport unit of 4K per access

results in the fact that each output record assigns
4 Kbytes in the file - incompatible with the previous
storage of 2 Kbytes. For the PLI1 file structure types
REGIONAL (1) and (3), data storage in 4K-structured
PAM files also becomes incompatible with the previous
format.

For the user, however, access does not change in any
way except that one more page must be provided for
storage assignment with the SPACE parameter in the
FILE command.

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3.4   Company name

The company name is no longer displayed in the final
compiler and runtime messages nor in the header line
of the compiler listing.
The company name which is displayed in the initial
PLI1 compiler message, depends on the used version
of the operating system BS2000/OSD.

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