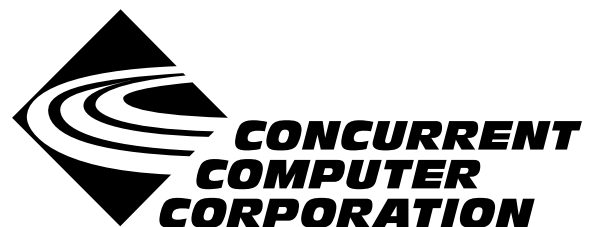


# Concurrent Fortran 77

## Version 6.1 Release Notes (Linux)

August 2004

0898536-6.1



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## 1.0. Introduction

Concurrent Fortran 77 is a cross-compiler which uses Concurrent's Common Code Generator (CCG) technology to produce highly optimized object code tailored to Concurrent systems running PowerMAX OS™. Concurrent Fortran 77 is part of the PowerWorks™ Linux® Development Environment (PLDE).

Concurrent Fortran 77 provides a command-line-based program development environment for building complex projects as well as various switches and enhancements for compatibility with a number of legacy F77 compilers.

This release does not require un-installing previous versions of the Fortran compilers. It installs in its own unique location and provides a mechanism for supporting the use of multiple releases.

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## 2.0. Documentation

Table 2-1 lists the Concurrent Fortran 77 Version 6.1 documentation available from Concurrent.

**Table 2-1. Concurrent Fortran 77 Version 6.1 Documentation**

Manual Name	Pub. Number
<i>Concurrent Fortran 77 Reference Manual</i>	0890240-100
<i>Concurrent Fortran 77 Version 6.1 Release Notes (Linux)</i>	0898536-6.1

Copies of the Concurrent documentation can be ordered by contacting the Concurrent Software Support Center. The toll-free number for calls within the continental United States is 1-800-245-6453. For calls outside the continental United States, the number is 1-954-283-1822 or 1-305-931-2408.

Additionally, the manuals listed above are available:

- online using the PowerWorks Linux Development Environment utility, **nhelp** (*release notes only*)
- in PDF format in the **documentation** directory of the PLDE Installation CD
- on the Concurrent Computer Corporation web site at [www.ccur.com](http://www.ccur.com)

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## 3.0. Prerequisites

Prerequisites for Concurrent Fortran 77 Version 6.1 for both the host system and target system are as follows:

### 3.1. Host System

#### 3.1.1. Software

- RedHawk™ Linux *or* Red Hat® Linux
- Required capabilities

#### NOTE

The following capabilities are normally installed as part of the standard installation of the PowerWorks Linux Development Environment. During installation of the PLDE, the user will be notified if required capabilities do not exist on the Linux system.

Capabilities	RPMs providing these capabilities
<code>ccur-HyperHelp</code> <code>ccur-HyperHelp-scripts</code> <code>ccur-nhelp</code> <code>plde-pmax-crossdev</code>	<code>ccur-x11progs-6.4.2-006</code> <code>ccur-HyperHelp-scripts-6.4.2-002</code>  <i>any or all of the following:</i> <code>plde-pmax-crossdev-4.3-P14-1</code> <code>plde-pmax-crossdev-5.1-SR8-1</code> <code>plde-pmax-crossdev-6.1-SR1-1</code>

#### 3.1.2. Hardware

- an Intel®-based PC - 300Mhz or higher (recommended minimum configuration)
- 64MB physical memory (recommended minimum configuration)

## 3.2. Target System

### 3.2.1. Software

- PowerMAX OS 4.3 or later

### 3.2.2. Hardware

- Computer Systems:
  - Power Hawk™ 620 and 640
  - Power Hawk 710, 720 and 740
  - Power Hawk 910 and 920
  - PowerStack™ II and III
  - Night Hawk® Series 6000
  - TurboHawk™
  - PowerMAXION™
- Board-Level Products:
  - Motorola® MVME2604
  - Motorola MVME4604



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## 4.0. System Installation

Installation of the host portion of Concurrent Fortran 77 is normally done as part of the general installation of the PowerWorks Linux Development Environment software suite. A single command installs (or uninstalls) all software components of the PLDE, as described in the *PowerWorks Linux Development Environment Release Notes* (0898000).

The following section describes how to install (or uninstall) Concurrent Fortran 77 separately from the PLDE suite for those rare cases when this is necessary.

The PowerMAX OS cross-development libraries are installed on your Linux system as part of the PLDE. These libraries must exist in order to cross-compile and cross-link on that system.

### 4.1. Separate Host Installation

In rare cases, it may be necessary to install (or uninstall) Concurrent Fortran 77 independent of the installation of the PowerWorks Linux Development Environment software suite. This may be done using the standard Linux product installation mechanism, **rpm** (see **rpm (8)**).

The RPMs associated with Concurrent Fortran 77 Version 6.1 are:

```
ccur-invoker  
ccur-common-tools-6.1  
ccur-f77-tools-6.1  
ccur-f77-manpages  
plde-f77-6.1  
plde-f77libs-6.1  
plde-f77help-6.1
```

and the files associated with these RPMs are:

```
ccur-invoker-6.1-1.i386.rpm  
ccur-common-tools-6.1-000-1.i386.rpm  
ccur-f77-tools-6.1-000-1.i386.rpm  
ccur-f77-manpages-000-1.i386.rpm  
plde-f77-6.1-000-1.i386.rpm  
plde-f77libs-6.1-000-1.i386.rpm  
plde-f77help-6.1-000-1.i386.rpm
```

These files can be found in the **linux-i386** directory on the PowerWorks Linux Development Environment Installation CD.

#### NOTE

The user must be root in order to use the **rpm** product installation mechanism on the Linux system.

To install the Concurrent Fortran 77 RPMs, issue the following commands on your Linux system:

1. Insert the PowerWorks Linux Development Environment Installation CD in the CD-ROM drive
2. Mount the CD-ROM drive (assuming the standard mount entry for the CD-ROM device exists in `/etc/fstab`)

```
mount /mnt/cdrom
```

3. Change the current working directory to the directory containing the Concurrent Fortran 77 RPMs

```
cd /mnt/cdrom/linux-i386
```

4. Install the `ccur-invoker` RPM

If you have an existing PLDE installation, you may first need to remove the old `plde-c++-invoker` RPM. Check for the existence of the `plde-c++invoker` RPM:

```
rpm -q plde-c++-invoker
```

If it is installed, uninstall it with the following command (the `--nodeps` option is required):

```
rpm -e --nodeps plde-c++-invoker
```

Install the new `ccur-invoker` RPM:

```
rpm -Uvh ccur-invoker*.rpm
```

#### NOTE

The `ccur-invoker` RPM is used by all the Concurrent C/C++ and Fortran compiler products. It may be already installed and up-to-date. If so, the `rpm` command above will fail with an appropriate diagnostic. You may proceed to the next step.

5. Install the remaining RPMs

```
rpm -Uvh ccur-common-tools-6.1-000-1.i386.rpm \  
ccur-f77-tools-6.1-000-1.i386.rpm \  
ccur-f77-manpages-000-1.i386.rpm \  
plde-f77-6.1-000-1.i386.rpm \  
plde-f77libs-6.1-000-1.i386.rpm \  
plde-f77help-6.1-000-1.i386.rpm
```

#### NOTE

Your system may already have up-to-date versions of some of these RPMs installed. If so, the `rpm` command above will fail. Reissue the `rpm` command omitting the RPMs that are already installed and up-to-date.

## NOTE

The **plde-f77help-6.1** RPM is not required for the compiler to function.

6. Change the current working directory outside the **/mnt/cdrom** hierarchy

```
cd /
```

7. Unmount the CD-ROM drive (otherwise, you will be unable to remove the PowerWorks Linux Development Environment Installation CD from the CD-ROM drive)

```
umount /mnt/cdrom
```

To uninstall the Concurrent Fortran 77 Version 6.1 RPMs, use the following command:

```
rpm -e ccur-invoker \  
ccur-common-tools-6.1 \  
ccur-f77-tools-6.1 \  
ccur-f77-manpages \  
plde-f77-6.1 \  
plde-f77libs-6.1 \  
plde-f77help-6.1
```

## NOTE

Some of the RPMs may be required by other tools or compilers. If so, the **rpm** command above will fail with an appropriate diagnostic. Reissue the **rpm** command, omitting the RPMs that are required by other tools.

## 4.2. Cross-Development Libraries

In order to cross-compile and cross-link on the Linux system, it is necessary to have certain PowerMAX OS libraries installed on that system. These cross-development libraries are installed on your Linux system as part of the PLDE.

The names of the RPMs containing the PowerMAX OS libraries minimally required for cross-linking are:

```
plde-pmax-crossdev-4.3  
plde-pmax-crossdev-5.1  
plde-pmax-crossdev-6.1
```

and are used when linking for PowerMAX OS 4.3, PowerMAX OS 5.1, and PowerMAX OS 6.1 target systems, respectively. The files associated with these RPMs are:

```
plde-pmax-crossdev-4.3-P14-1.i386.rpm  
plde-pmax-crossdev-5.1-SR8-1.i386.rpm  
plde-pmax-crossdev-6.1-SR1-1.i386.rpm
```

#### **NOTE**

The version number is part of the name of the RPM. Therefore, it is possible to have all three RPMs installed on the Linux system at the same time. This allows the user to generate executables for multiple PowerMAX OS versions from the same Linux system.

User applications built with Concurrent Fortran 77 may require other capabilities which are provided by additional RPMs included on the PLDE Installation CD. Refer to the section titled “Cross-Development Libraries and Headers” in the *PowerWorks Linux Development Environment Release Notes (0898000)* for more information.

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## 5.0. Using Concurrent Fortran 77

The following should be taken into consideration in order to use Concurrent Fortran 77.

### 5.1. Invoking the Compiler

There are now three Concurrent Fortran 77 products available separately. Each is invoked differently.

- Concurrent Fortran 77 (PowerMAX)  
Native PowerPC® - invoked with the **f77** or **hf77** commands (as has always been the case).
- Concurrent Fortran 77 (Linux®)  
Intel™-to-PowerPC cross-compiler - invoked with the **xf77** command.
- Concurrent Fortran 77 for RedHawk™ Linux  
Native Intel Pentium® - invoked with the **cf77** command (due to the fact that **f77** and **hf77** already exist on Linux systems).

### 5.2. PATH and PDE\_RELEASE Considerations

To utilize the Concurrent Fortran 77 compiler, specify the following in your PATH environment variable:

```
PATH=$PATH:/usr/ccs/bin
```

The compiler should then be invoked with **cf77**. (This contrasts with PLDE cross-compiler product which is invoked with **xf77**, or with the native PowerPC product which is invoked with **hf77** or **f77**).

Installing 6.1 compilers on your system will set the default release to 6.1.

If the default PLDE release on your system is not 6.1, it will be necessary to select the 6.1 release by one of the following methods:

- use the **--rel=6.1** option on the **hf77** / **cf77** / **xf77** command line
- set the **PDE\_RELEASE** environment variable to **6.1**
- set the user default release (**c.release -rel 6.1 -u**)
- set the system default release (**c.install -rel 6.1 -d**)

### 5.3. Makefile Considerations

Makefiles may already contain references to **f77**, **hf77**, or **g77** commands explicitly within them. Additionally, if default rules for compilation, such as

```
.f.o:
```

are not explicitly mentioned, the **make** processor will also attempt to invoke **hf77**, **f77**, or **g77**.

To invoke the Concurrent Fortran 77 compilers you can take any of the following approaches.

### 5.3.1. Explicit Modification Using `hf77` / `cf77` / `xf77`

Ensure that `/usr/ccs/bin` is in your `PATH` environment variable.

Modify all occurrences of `f77`, `hf77`, and `g77` to utilize `hf77`, `cf77`, or `xf77` as appropriate.

Supply default `.f.o` rules (and the like) to explicitly utilize the appropriate command.

### 5.3.2. Use of F77 Environment or Make Variables

One approach that requires minimal changes to Makefiles, etc., is to use environment variables or `make` variables to control which compiler you're using. The following commands will all build using Concurrent Fortran 77 for RedHawk Linux:

Short-lived environment variables:

```
# F77=cf77 make arguments
```

`make` variables:

```
# make arguments F77=cf77
```

Long-lived environment variables:

```
# export F77=cf77
# make arguments
```

You can also use the long-lived environment variable approach by adding the following to your login script (e.g. `.profile` or `.login`, depending on your shell):

```
export F77=cf77
```

Or, if you prefer finer-grained control, you can add lines like the following to the top of any Makefiles that should use the Concurrent Fortran 77 compiler:

```
F77=cf77
```

The changes will then only affect the modified Makefiles. Note that this solution only works for Makefiles that use the default `.f.o` rules. If they contain hard-coded references to `f77` or `g77`, then the Makefiles must be changed to use `$(F77)` instead. If the Makefile references anything such as `g77` (Linux's GNU F77 compiler), then it will need to be changed, regardless.

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## 6.0. Changes in This Release

Users should be aware of the following changes in Concurrent Fortran 77 Version 6.1:

- Files with the `.fpp` extension will be passed through the `cpp` tool to be preprocessed.
- Source files may end in Carriage Return/Line Feed now instead of just Line Feed.

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## 7.0. Cautions

Users of Concurrent Fortran 77 Version 6.1 should be aware of the following issues.

### 7.1. Byte Endian Issues

FORTTRAN source code that makes assumptions about byte order may require modification to run on both PowerPC and Intel processors. Such dependencies usually occur in `EQUIVALENCE` statements, Hollerith constants, intrinsics that extract bits, and passing by reference wrong-sized integer variables to functions.

### 7.2. CPP

The FORTRAN compiler uses the system `cpp` tool. There may be subtle incompatibilities between `/lib/cpp` on PowerMAX OS and `/usr/bin/cpp -traditional` on Linux.

### 7.3. NaN

Programs that generate a Not a Number (NaN) may cause a signal when compiled for Intel processors where they don't on the PowerPC. This is because PowerPC allows a NaN to be loaded into a floating point register without generating a signal.

### 7.4. CALL used on floating-point functions

On Concurrent Fortran 77 for RedHawk Linux, if the `CALL` statement is used to call a function that returns a floating-point value, the compiler has no way to know that the function has pushed a value onto the floating-point register stack. This will usually result in a floating-point register stack overflow signal being raised.



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## 8.0. Direct Software Support

Software support is available from a central source. If you need assistance or information about your system, please contact the Concurrent Software Support Center at 1-800-245-6453. Our customers outside the continental United States can contact us directly at 1-954-283-1822 or 1-305-931-2408. The Software Support Center operates Monday through Friday from 8 a.m. to 7 p.m., Eastern Standard time.

Calling the Software Support Center gives you immediate access to a broad range of skilled personnel and guarantees you a prompt response from the person most qualified to assist you. If you have a question requiring on-site assistance or consultation, the Software Support Center staff will arrange for a field analyst to return your call and schedule a visit.





