

DKBLUPF90 Installation Guide

Version: 1.0

Last Updated: February 13, 2026

Author: Dr. DEUKMIN LEE (Hankyong National University)

Email: dhlee@hknu.ac.kr

Table of Contents

1. System Requirements
 2. Pre-Installation Checklist
 3. Installation Methods
 4. Post-Installation Verification
 5. Troubleshooting
 6. Uninstallation
-

System Requirements

Minimum Requirements

- **Operating System:** Linux (Ubuntu 18.04+, CentOS 7+, RHEL 7+, Debian 10+)
- **Compiler:** gfortran 4.8 or higher
- **Build Tools:** make, ar (binutils)
- **Disk Space:** 100 MB (source + binaries)
- **Memory:** 4 GB RAM

Recommended Requirements

- **Operating System:** Ubuntu 20.04 LTS or newer
- **Compiler:** gfortran 9.0 or higher
- **Disk Space:** 500 MB (including test data)
- **Memory:** 8 GB RAM or more (for large datasets)

Dependencies

Required

```
# Ubuntu/Debian
sudo apt-get install build-essential gfortran make
```

```
# CentOS/RHEL/Fedora
sudo yum install gcc gcc-gfortran make binutils
```

Optional (for documentation)

```
# Ubuntu/Debian
sudo apt-get install pandoc texlive-xetex texlive-latex-extra
```

```
# CentOS/RHEL/Fedora
sudo yum install pandoc texlive-xetex texlive-latex
```

Pre-Installation Checklist

1. Check gfortran Installation

```
gfortran --version
# Output should show version 4.8 or higher
```

2. Verify Build Tools

```
make --version
ar --version
```

3. Check Available Disk Space

```
df -h /usr/local # For system-wide installation
df -h $HOME       # For user installation
```

4. Prepare Installation Directory

```
# For user installation (recommended for non-admin users)
mkdir -p ~/.local/bin
mkdir -p ~/.local/lib
mkdir -p ~/.local/include
```

Installation Methods

Method 1: Automatic Installation (Recommended)

System-Wide Installation (requires root)

```
cd /home/your_user/DKBLUPF90
sudo ./install.sh
```

Installation Locations: - Libraries: /usr/local/lib/libdkblupf90.so* - Binaries: /usr/local/bin/ReadFR - Headers: /usr/local/include/dkblupf90/ - Examples: /usr/local/share/dkblupf90/examples

User Directory Installation (no root required)

```
cd /home/your_user/DKBLUPF90
PREFIX=$HOME/.local ./install.sh
```

Installation Locations: - Libraries: ~/.local/lib/libdkblupf90.so* - Binaries: ~/.local/bin/ReadFR - Headers: ~/.local/include/dkblupf90/

Add to PATH:

```

# Add to ~/.bashrc or ~/.zshrc
export PATH="$HOME/.local/bin:$PATH"
export LD_LIBRARY_PATH="$HOME/.local/lib:$LD_LIBRARY_PATH"

# Apply changes
source ~/.bashrc

```

Method 2: Manual Installation

Build Library

```

cd /home/your_user/DKBLUPF90
make clean          # Clean previous builds
make lib            # Build shared library

```

Build ReadFR Program

```
make readfr      # Build ReadFR
```

Install to Standard Location

```

# Create installation directory
sudo mkdir -p /usr/local/lib /usr/local/bin /usr/local/include/dkblupf90

# Copy library
sudo cp lib/libdkblupf90.so* /usr/local/lib/

# Copy binary
sudo cp bin/ReadFR /usr/local/bin/

# Copy headers/modules
sudo cp include/*.mod /usr/local/include/dkblupf90/

# Update library cache
sudo ldconfig

```

Install to User Directory

```

# Create installation directory
mkdir -p $HOME/.local/lib $HOME/.local/bin $HOME/.local/include/dkblupf90

# Copy files
cp lib/libdkblupf90.so* $HOME/.local/lib/
cp bin/ReadFR $HOME/.local/bin/
cp include/*.mod $HOME/.local/include/dkblupf90/

# Update PATH and LD_LIBRARY_PATH in ~/.bashrc
echo 'export PATH="$HOME/.local/bin:$PATH"' >> ~/.bashrc
echo 'export LD_LIBRARY_PATH="$HOME/.local/lib:$LD_LIBRARY_PATH"' >> ~/.bashrc
source ~/.bashrc

```

Method 3: Docker Installation (Optional)

```
FROM ubuntu:20.04
RUN apt-get update && apt-get install -y build-essential gfortran make
WORKDIR /tmp
COPY DKBLUPF90 /tmp/DKBLUPF90
WORKDIR /tmp/DKBLUPF90
RUN sudo ./install.sh
ENTRYPOINT ["ReadFR"]
```

Post-Installation Verification

1. Verify Installation Locations

```
# Check binary
which ReadFR
ReadFR --version 2>&1 | head -1

# Check library
ldconfig -p | grep libdkblupf90
```

2. Validate Binary Functionality

```
cd /usr/local/share/dkblupf90/examples # or copy examples to working dir
ReadFR parameter
```

```
# Check output file
ls -lh GENO_QC_*.geno
```

3. Run Test Suite

```
cd /home/your_user/DKBLUPF90
make test
```

4. Troubleshoot Library Loading

```
# Check library dependency
ldd /usr/local/bin/ReadFR

# Set library path if needed
export LD_LIBRARY_PATH=/usr/local/lib:$LD_LIBRARY_PATH
ReadFR parameter
```

Troubleshooting

Issue 1: “gfortran: command not found”

```
# Ubuntu/Debian
sudo apt-get install gfortran

# CentOS/RHEL
sudo yum install gcc-gfortran
```

Issue 2: “libdkblupf90.so: cannot open shared object file”

```
# Add library path
export LD_LIBRARY_PATH=/usr/local/lib:$LD_LIBRARY_PATH

# Or make it permanent (add to ~/.bashrc)
echo 'export LD_LIBRARY_PATH=/usr/local/lib:$LD_LIBRARY_PATH' >> ~/.bashrc
source ~/.bashrc

# Update library cache
sudo ldconfig
```

Issue 3: “Permission denied” during installation

```
# Use sudo for system-wide installation
sudo ./install.sh

# Or use user directory installation
PREFIX=$HOME/.local ./install.sh
```

Issue 4: Compilation errors

```
# Check gfortran version
gfortran --version

# Ensure minimum version 4.8
# If version is too old, update:
# Ubuntu/Debian
sudo apt-get install gfortran-9

# CentOS/RHEL
sudo yum install devtoolset-9-gcc-gfortran
scl enable devtoolset-9 bash
```

Issue 5: “segmentation fault” or runtime errors

```
# Rebuild with debug symbols
make clean
CFLAGS="-g -O0" make lib
make readfr
```

```
# Run with gdb
gdb --args ReadFR parameter
(gdb) run
```

Uninstallation

System-Wide Installation

```
# Remove binary
sudo rm /usr/local/bin/ReadFR

# Remove library
sudo rm /usr/local/lib/libdkblupf90.so*

# Remove headers
sudo rm -rf /usr/local/include/dkblupf90

# Remove examples
sudo rm -rf /usr/local/share/dkblupf90

# Update library cache
sudo ldconfig
```

User Directory Installation

```
# Remove binary
rm ~/.local/bin/ReadFR

# Remove library
rm ~/.local/lib/libdkblupf90.so*

# Remove headers
rm -rf ~/.local/include/dkblupf90
```

Environment Variables

Recommended Settings

```
# Add to ~/.bashrc or ~/.bash_profile
export DKBLUPF90_HOME=/usr/local # or $HOME/.local for user installation
export PATH="$DKBLUPF90_HOME/bin:$PATH"
export LD_LIBRARY_PATH="$DKBLUPF90_HOME/lib:$LD_LIBRARY_PATH"
export FFLAGS="-O2 -fPIC"
```

Verification

```
# Test environment variables
echo $DKBLUPF90_HOME
echo $LD_LIBRARY_PATH
which ReadFR
```

Support and Feedback

For installation issues or feedback: - **Email:** dhlee@hknu.ac.kr - **Organization:** Hankyong National University - **Department:** Department of Animal Science

Reporting Installation Issues

When reporting issues, please provide: 1. Operating system (output of `uname -a`) 2. gfortran version (output of `gfortran --version`) 3. Error messages (complete output) 4. Installation method used 5. Installation directory chosen

License

DKBLUPF90 is released under the MIT License. See LICENSE file for details.

End of Installation Guide

Version 1.0 | February 13, 2026