Pro*COBOL Precompiler

Getting Started

Releases 8.1.6 and 1.8.51 for Windows

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Pro*COBOL Precompiler Getting Started, Releases 8.1.6 and 1.8.51 for Windows

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Contact Us!

Pro*COBOL Precompiler Getting Started, Releases 8.1.6 and 1.8.51 for Windows

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This document describes how to contact Oracle Corporation if you have issues with the documentation or software.

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How to Contact Oracle Technical Publications

Oracle Corporation welcomes your comments and suggestions on the quality and usefulness of this publication. Your input is an important part of the information used for revision.

- Did you find any errors?
- Is the information clearly presented?
- Do you need more information? If so, where?
- Are the examples correct? Do you need more examples?
- What features did you like most about this guide?
- Do you have suggestions for improvement? Please indicate the chapter, section, and page number (if available).

You can send comments regarding documentation in the following ways:

- Electronic mail - ntdoc@us.oracle.com
- FAX - (650) 506-7370   Attn: Oracle Windows Platforms Server Documentation
- Postal service:
  Oracle Corporation
  Windows Platforms Server Documentation Manager
  500 Oracle Parkway, MS 1OP8,
  Redwood Shores, CA 94065
  USA

If you would like a reply, please provide your name, address, and telephone number.

How to Contact Oracle Support Services

Please copy this form and distribute within your organization as necessary.

Oracle Support Services can be reached at the following telephone numbers and Web sites. The hours of business are detailed in your support contract and the *Oracle Customer Support Guide* in your kit.

Oracle Support Services In...	Call...
United States of America	+ (650) 506-1500 for customers with support contracts.
	+ (650) 506-5577 to obtain a support contract.
Europe	+44 1344 860 160 or the local support center in your country.
All other locations	The telephone number for your country listed at the following Web site:
	`http://www.oracle.com/support/contact_us/sup_hot_phone.html`
	Oracle Support Services telephone numbers are also listed in the *Oracle Customer Support Guide* in your kit.

Please complete the following checklist before you call. If you have this information ready, your call can be processed much quicker.

❏   Your CPU Support Identification Number (CSI Number) if applicable.

❏   The hardware name on which your application is running.

❑ The operating system name and release number on which your application is running.

- ■ To verify the operating system version on Windows NT, enter the following at the MS-DOS command prompt:

  ```
  C:\> WINMSD
  ```

  The *Windows NT Diagnostics* dialog box displays the operating system and Service Pack version.

❑ The release numbers of the Oracle Server and associated products involved in the current problem. For example, Oracle8*i* Enterprise Edition release 8.1.6.0.0 and Oracle Enterprise Manager release 2.1.0.0.0.

- ■ To verify the release number of the Oracle Server, connect to the database using a tool such as SQL*Plus. The release number is displayed. For example:

  ```
  Connected to:
  Oracle8i Enterprise Edition Release 8.1.6.0.0 – Production
  With the Partitioning and Java options
  PL/SQL Release 8.1.6.0.0 – Production
  ```

❑ The third-party software version you are using.

- ■ To verify an application version, from the application's Help menu, select About...

❏ The exact error codes and messages. Please write these down as they occur. They are critical in helping Oracle Support Services to quickly resolve your problem. Note whether there were no errors reported.

_____

_____

_____

_____

_____

❏ A description of the issue, including:

■ **What happened?** For example, the command used and its result.

_____

_____

_____

■ **When did it happen?** For example, during peak system load, or after a certain command, or after an operating system upgrade. In addition, what was happening when the problem occurred?

_____

_____

_____

■ **Where did it happen?** For example, on a particular system, or within a certain procedure or table.

_____

_____

_____

- **What is the extent of the problem?** For example, production system unavailable, or moderate impact but increasing with time, or minimal impact and stable.

- Did the problem affect one user, several users, or all users?

- Has anything changed? For example, if this is an operation that used to work and now fails, what is different? Can you undo any recent changes, to verify whether they are relevant to the issue?

- **Can the problem be reproduced?** This is a critical question for support analysts. For example, did the problem recur on the same system, under the same circumstances? Can the problem be reproduced on another system? Additionally:

- Does installing a software component fail on all client machines, or just one?

- Do all clients fail to connect to the server, or just one?

- If you are able to restart the server or database, does restarting the database or rebooting the server or client machine (if applicable) make a difference?

❏ Keep copies of the Oracle alert log, any trace files, core dumps, and redo log files recorded at or near the time of the incident. Oracle Support Services may need these to further investigate your problem.

To help analyze problems:

- Archive or delete old alert logs. When the database is started without an alert log, a new one is created. In some cases, if you force the problem to recur with a new alert log, the timestamps for the recorded events may indicate which events are relevant.

- Archive or delete old trace files. To check whether the file was modified, right-click and select Properties. The *Properties* dialog box displays the modification date.

- Check the operating system error logs, especially the System log and Application log. These files are relevant to the Oracle Server. To view these files, from the Start menu, choose Programs > Administrative Tools > Event Viewer, and choose System or Application from the Log main menu.

Resources for Oracle Partners and Developers

This section provides information on partner programs and resources for Oracle database administrators and application developers.

Information Source	Description
Oracle Corporation Home Page `http://www.oracle.com`	This Web site is the starting point for general information on Oracle Corporation.
Alliance Online `http://alliance.oracle.com`	Oracle provides leading-edge technology, education, and technical support that enables you to effectively integrate Oracle into your business. By joining the Oracle Partner Program, you demonstrate to customers that you are committed to delivering innovative Oracle-based solutions and services. The greater your commitment to Oracle, the more we can help you grow your business. It's that simple. The value you derive is associated directly with your level of commitment.
Oracle Education `http://education.oracle.com/`	Customers come to Oracle Education with a variety of needs. You may require a complete curriculum based on your job role to enable you to implement new technology. Or you may seek an understanding of technology related to your key area of responsibility to help you meet technical challenges. You may be looking for self-paced training that can be used as an ongoing resource for reference and hands-on practice. Or, you may be interested in an overview of a new product upgrade. Whatever your training need, Oracle Education has the solution.

Information Source	Description
Oracle Technology Network `http://technet.oracle.com/`	The Oracle Technology Network is your definitive source for Oracle technical information for developing for the Internet platform. You will be part of an online community with access to free software, Oracle Technology Network-sponsored Internet developer conferences, and discussion groups on up-to-date Oracle technology. Membership is free.
Oracle Store `http://oraclestore.oracle.com/`	This is Oracle's online shopping center. Come to this site to find special deals on Oracle software, documentation, publications, computer-based training products, and much more.
Oracle Support Services' Support Web Center `http://www.oracle.com/support/`	Oracle Support Services offers a range of programs so you can select the support services you need and access them in the way you prefer: by telephone, electronically, or face to face. These award-winning programs help you maintain your investment in Oracle technology and expertise. Here are some of the resources available in the Support Web Center:

Oracle*MetaLink*
 	
`http://www.oracle.com/support/`
`elec_sup/index.html`
	Oracle*MetaLink* is Oracle Support Services' premier Web support service. It is available to Oracle*metals* customers (Gold, Silver, Bronze), 24 hours a day, seven days a week.

Oracle*Lifecycle*
 	
`http://www.oracle.com/support/`
`sup_serv/lifecycle/index.html`
	Oracle*Lifecycle* is designed to deliver customized, industry-focused, full life-cycle support solutions that enable industry leaders to use Oracle technology to make smart business decisions, achieve operational excellence, and succeed in their markets.

Expert*ONLINE*
 	
`http://www.oracle.com/support/`
`sup_serv/online/index.html`
	Oracle Support Services has launched a new line of services called Expert*ONLINE*. These services provide online database administration for companies looking to supplement their existing DBA staff or fill a DBA role. Services range from Expert*DETECT*, a monitoring, diagnostic, and recommendation service, to Expert*DBA*, a full online database administration service.

Virtual Support Analyst (VSA)
 	
`http://www.oracle.com/support/`
`sup_serv/vsa_start.html`
	VSA is Oracle's Internet e-mail service; it is available to U.S. customers with an Oracle*metals* support agreement. With VSA, you can initiate a request for assistance through e-mail, bypassing the queues you may encounter when using telephone support. VSA also enables you to access Oracle's bug database.

Information Source	Description

Customer Service
 	
`http://www.oracle.com/support/`
`cus_serv/index.html`
	This site provides resources to make your interactions with Oracle as easy as possible. Among the things you can do are:
	
	■ Learn what is a CPU Support Identification (CSI) number
	
	■ Update your technical contact information
	
	■ Find out whom to contact for invoice and collection issues
	
	■ Request product update shipments
	
	■ Access a glossary of Oracle Support Services terms

U.S. Customer Visit Program
 	
`http://www.oracle.com/support/`
`cus_serv/cus_visit.html`
	This U.S.-based program has been established to help our customers understand and obtain maximum benefit from the support services they have purchased.
	
	The visit typically offers a customized orientation presentation, a comprehensive overview and demonstration of Oracle's electronic services, and helpful tips on working more effectively with Oracle Support Services.

Support Web Center Library
 	
`http://www.oracle.com/support/`
`library/index.html`
	This site contains articles, guides, and other documentation to help you leverage the wealth of knowledge and reference material that Oracle Support Services produces.

Preface

This guide provides introductory information for the Pro*COBOL precompiler
running on Microsoft Windows NT and Windows 95/98 operating systems. Specific
topics discussed in this preface are:

- Prerequisites
- Intended Audience
- How This Guide Is Organized
- Conventions
- Documentation Library
- Related Documents

Prerequisites

This guide assumes that you:

- Can use a COBOL compiler in the Windows NT and Windows 95/98 environments

- Are familiar with Windows NT and Windows 95/98 commands such as deleting and copying files

- Understand the concepts of the search path, configuration files, and directory structure

- Are able to use a text editor to make changes to an ASCII text file

Intended Audience

This guide is necessary for anyone who wants to use Pro*COBOL release 8.1.6 and/or 1.8.51 for Windows.

How This Guide Is Organized

This guide contains the following chapters:

Chapter 1, "Introducing Pro*COBOL"

Describes the Oracle programmatic interface for the COBOL language running on Windows NT and Windows 95/98 operating systems.

Chapter 2, "Building Pro*COBOL Applications"

Provides an overview of building Oracle database applications with Pro*COBOL release 8.1.6 and 1.8.51 for Windows.

Conventions

The following conventions are used in this guide.

Convention	Example	Meaning
All uppercase plain	SQL> ALTER DATABASE	Indicates command names, SQL reserved words, and keywords.
Italic	Italic is used to indicate a variable: *filename*	Indicates a value that you must provide. For example, if a command asks you to type *filename*, you enter the actual name of the file.
		Italic is also used for emphasis in the text and to indicate the titles of other guides.
square brackets [ ]	x:\[pathname]\oracle\home_name	Encloses optional items. For example, when you create an OFA-compliant Oracle home directory, you can place an optional pathname before the \oracle pathname.
		Square brackets also indicate a function key, for example [Enter].
C:\>	C:\ORACLE>	Represents the Windows platforms command prompt of the current hard disk drive. Your prompt may differ and may, at times, reflect the subdirectory in which you are working. Referred to as the *MS-DOS command prompt* in this guide.
Backslash (\) before a directory name	\bin	Indicates that the directory is a subdirectory of the root directory.

Convention	Example	Meaning
oracle_home and *oracle_base*	Go to the `oracle_base\oracle_home\bin` directory.	In this Optimal Flexible Architecture (OFA)-compliant release, all subdirectories are no longer under a top level `oracle_home` directory. There is now a new top-level directory called `oracle_base` that by default is `c:\oracle`. The Oracle home directories are located directly under `oracle_base`.
		If you install Oracle8i release 8.1.6 on a computer where there is no other Oracle software on the computer, the default settings for the first Oracle home directory is `c:\oracle\ora81`. If you run Oracle Universal Installer again and install release 8.2.x, the second Oracle home directory is called `\ora82`.
		All directory path examples in this guide follow OFA conventions. For more information on OFA, see *Oracle8i Administrator's Guide for Windows NT*.
HOME_NAME	OracleHOME_NAMETNSListener	Represents the Oracle home name. The home name can be up to sixteen alphanumeric characters. The only special character allowed in the home name is the underscore.
HOME*ID*	HOME0, HOME1, HOME2	Represents a unique registry subkey for each Oracle home directory in which you install products. A new HOME*ID* is created and incremented each time you install products to a different Oracle home directory on one machine. Each HOME*ID* contains its own configuration parameter settings for installed Oracle products.

Convention	Example	Meaning
Symbols	period . comma , hyphen - semicolon ; colon : equal sign = backslash \ single quote ' double quote " parentheses ()	Symbols other than brackets and vertical bars must be entered in commands exactly as shown.

Documentation Library

This guide is part of a larger library of Oracle documentation. The Oracle documentation library consists of two types of documentation:

Documentation Type	Describes
Operating System-specific	Installation, configuration, and use of Oracle products in a Windows NT or Windows 95/98 environment. Operating system-specific documents are occasionally referred to in the generic documentation set. These documents are easy to identify because they always mention their specific operating system in their title.
Generic	Oracle database, Oracle networking, and Application Programming Interfaces information that is uniform across all operating system platforms. The majority of documents in your documentation set belong to this category. While reading through the generic documentation set, you are occasionally asked to refer to your platform (or operating system) documentation for procedures specific to the Windows NT or Windows 95/98 operating systems.
	To easily identify where these generic documentation references are described in your operating system documentation, see the index of this guide for the following entry:
	generic documentation references
	All generic documentation references described in this guide appear under this index entry.

Related Documents

For more information, see the following manuals.

- *Oracle8i Installation Guide for Windows NT*

- *Oracle8i Release Notes for Windows NT*

- *Oracle8i Administrator's Guide for Windows NT*

- *Oracle Enterprise Manager Administrator's Guide*

- *Net8 Administrator's Guide*

- *Oracle8i Parallel Server Concepts*

- *Oracle Parallel Server Administrator's Guide for Windows NT*

- *Getting to Know Oracle8i*

- *Oracle8i Reference*

- *Oracle8i Error Messages*

- *Pro*COBOL Precompiler Programmer's Guide*

1

Introducing Pro*COBOL

This chapter describes the Oracle programmatic interface for the COBOL language running on Windows operating systems. Specific topics discussed are:

- What is Pro*COBOL?
- Release 1.8.51
- Supported Compilers
- Features
- Restrictions
- Directory Structure

> **See Also:** For more information on these topics, see the
> *Pro*COBOL Precompiler Programmer's Guide.*

What is Pro*COBOL?

To access an Oracle database, you use a high-level query language called Structured Query Language (SQL). You often use SQL through an interactive interface, such as SQL*Plus.

Pro*COBOL is a programming tool that enables you to embed SQL statements in a COBOL program. The Pro*COBOL precompiler converts the SQL statements in the COBOL program into standard Oracle run-time library calls. The generated output file can then be compiled, linked, and run in the usual manner.

Use the Pro*COBOL precompiler when rapid development and compatibility with other systems are your priorities.

Release 1.8.51

Oracle Corporation expects that any application written for Pro*COBOL release 1.8.*x* should precompile successfully with Pro*COBOL release 8.1.6. However, some vendor extensions may not be accepted and the application may not precompile successfully when migrating from release 1.8.x to release 8.1.6.

> **Note:** To install Pro*COBOL release 1.8.51, you need to choose Custom Installation when installing the Oracle programmer products.

If you simply want to migrate a release 1.8.*x* application to release 8.1.6 without using any of the new features of Pro*COBOL version 8, but the application does not precompile successfully, then do the following:

- Use release 1.8.51.
- Report the problem to Oracle Support Services.

> **Note:** Oracle Corporation recommends that you use release 8.1.6 to develop new applications.

Supported Compilers

Pro*COBOL supports the following compilers:

- Fujitsu COBOL version 4.0 or later for 32-bit Windows NT and Windows 95/98

  Note: Pro*COBOL does not support the following Fujitsu COBOL extensions:

  - USAGE BIT clause in data description entry
  - CHARACTER TYPE clause in data description entry
  - PRINTING POSITION clause in data description entry
  - @OPTIONS compiler option directing statement
  - Literal coded on column 73 or later

- MERANT Micro Focus NetExpress version 3.0 for 32-bit Windows NT and Windows 95

  Note: Pro*COBOL does not support Object Oriented COBOL (OOCOBOL) specifications for either compiler.

Features

Pro*COBOL supports the following:

- Oracle databases release 8.1.x
- Embedded PL/SQL blocks
- Bundled database calls, which can provide better performance in client/server environments
- Full ANSI compliance for embedded SQL programming
- Calls to PL/SQL stored procedures

Restrictions

Pro*COBOL does not support the following:

- User exits
- Access to the Oracle Call Interface
- Oracle8*i* object types
- Graphical user interface
- 16-bit code generation

Directory Structure

When you install Pro*COBOL, Oracle Universal Installer creates a directory called \precomp in your *oracle_base**oracle_home* directory.

Note: The \precomp directory can contain files for other products, such as Pro*C/C++.

The \precomp directory contains the following directories:

Directory Name	Contents
\admin	Configuration files
\demo\procob2	Sample programs for Pro*COBOL 8.1.6
\demo\procob	Sample programs for Pro*COBOL 1.8.51
\demo\sql	SQL scripts for sample programs
\doc\procob2	Readme files for Pro*COBOL 8.1.6
\doc\procob	Readme files for Pro*COBOL 1.8.51
\lib	Library files
\mesg	Message files
\public	Header files

Header Files

The *oracle_base**oracle_home*\precomp\public directory contains the Pro*COBOL header files.

Header File	Description
oraca.cob	Contains the Oracle Communications Area (ORACA), which helps you to diagnose runtime errors and to monitor your program's use of various Oracle resources.
oraca5.cob	ORACA5 is the COMP-5 version of ORACA.
sqlca.cob	Contains the SQL Communications Area (SQLCA), which helps you to diagnose runtime errors. The SQLCA is updated after every executable SQL statement.

Header File	Description
sqlca5.cob	SQLCA5 is the COMP-5 version of SQLCA.
sqlda.cob	Contains the SQL Descriptor Area (SQLDA), which is a data structure required for programs that use dynamic SQL Method 4.
sqlda5.cob	This is the COMP-5 version of SQLDA.

Library File

The *oracle_base**oracle_home*\precomp\lib directory contains the library file that you use when linking Pro*COBOL applications. The library file is called orasql8.lib.

2

Building Pro*COBOL Applications

This chapter provides an overview of building Oracle database applications with Pro*COBOL release 8.1.6 and 1.8.51 for Windows Platforms. Specific topics discussed are:

- Precompiling Pro*COBOL Applications

- Compiling and Linking Pro*COBOL Applications

- Sample Programs

> **Note:**   Build and execute Pro*COBOL applications in an MS-DOS command prompt session with the default settings for the screen buffer size and the windows size. These settings ensure successful execution of the Pro*COBOL applications.

Precompiling Pro*COBOL Applications

This section describes the basics of precompiling a Pro*COBOL application.

> **See Also:**   See the *Pro*COBOL Precompiler Programmer's Guide* for more information about Pro*COBOL commands, precompiler options, and configuration files.

The Pro*COBOL Commands

You can use one of three commands to precompile a file:

Use...	For Pro*COBOL Release...
procob *filename*	8.1.6
procob18 *filename*	1.8.51

By default, if no extension is provided, Pro*COBOL tries to open `filename`.`pco`. If the ONAME option is not specified, Pro*COBOL generates a file named `filename`.`cbl`.

Precompiler Options

Many useful options are available at precompile time. Included are options that allow you to determine how:

- Resources are used

- Errors are reported

- Input and output are formatted

- Cursors are managed

Viewing the Available Options

To see a list of available options and their default values, enter the following at the MS-DOS command prompt:

```
C:\> procob
```

To see the option, defaults, and the restrictions (if any) on values, enter the following at the MS-DOS command prompt:

```
C:\> procob /?
```

Configuration Files

Pro*COBOL reads the configuration file for options before processing options supplied at the command line.

- For release 8.1.6, the configuration file is called `pcbcfg.cfg`. This file is located in the *oracle_base**oracle_home* \precomp\admin directory.

- For release 1.8.51, the configuration file is called `pcccob.cfg`. This file is located in the `oracle_base\oracle_home\precomp\admin` directory.

The configuration file has the following two options:

- `comp5= yes | no`

- `include=`*oracle_base**oracle_home* \precomp\public

Check the following table to see whether you should change the value of `comp5`:

If you are using Fujitsu COBOL...	If you are using MERANT Micro Focus COBOL...
`comp5` must be set to `yes` (`comp5=yes`).	`comp5` can be set to `yes` (`comp5=yes`) or `no` (`comp5=no`).
■ All COMP data items (if they are potential host variables) are converted to COMP–5.	If `comp5=yes`:
■ All data items generated by the precompiler will be declared as COMP–5.	■ All COMP data items (if they are potential host variables) are converted to COMP–5.
	■ All data items generated by the precompiler will be declared as COMP–5.
	If `comp5=no`:
	■ The precompiler ignores COMP–5 host variables.
	■ Precompiled files generally do not run on Intel platforms.
	Workaround: During the compilation stage, use the MERANT Micro Focus COBOL compiler directive:
	MAKESYN "COMP–5" = "COMP"
	This statement directs the compiler to treat COMP items as if they are COMP–5 items.

The INCLUDE option enables the provided .COB files in the *oracle_base**oracle_home* \precomp\public directory to be included without an explicit INCLUDE= option at the command line.

MAXLITERAL Option for Fujitsu COBOL

If you are using the Fujitsu COBOL compiler, set the MAXLITERAL option to 160. The Fujitsu COBOL compiler cannot handle string literals that are longer than 160 characters. You can set this option in the configuration file as well as at the command line. The default value of the MAXLITERAL option is 256.

Using Embedded PL/SQL

If you are using embedded PL/SQL blocks, do the following:

1. Enter the SQLCHECK option and the USERID string to connect at the precompiling command line.

2. Specify the SQLCHECK=FULL option to check the syntax or semantics of embedded SQL statements and PL/SQL blocks.

> **See Also:** For an example of a command line string, see the *Pro*COBOL Precompiler Programmer's Guide* or review the PL/SQL MAKE file.

Compiling and Linking Pro*COBOL Applications

This section describes how to compile and link Pro*COBOL applications using the following compilers:

- Fujitsu Compiler

- MERANT Micro Focus Compiler

Fujitsu Compiler

You can build and execute a Fujitsu COBOL application in two ways:

- Using Fujitsu COBOL Project Manager

- Using the COBOL32 and LINK Commands

Using Fujitsu COBOL Project Manager

Programs generated by Pro*COBOL can be compiled and executed from within Fujitsu COBOL Project Manager.

To avoid potential inconsistencies when calling routines in the Oracle libraries, use the "COMP5=YES" option. This step is required because binary numbers for COBOL

BINARY/COMP data are stored in Big Endian format. Oracle libraries expect binary numbers to be stored in Little Endian format (machine format).

To debug the application using the Interactive Debugger WINSVD when the COBOL application is compiled, the compiler option TEST must be selected.

When you click Build/Rebuild, COBOL Project Manager generates the executable and WINSVD debug information.

After building the application, you can debug the application using the Interactive Debugger WINSVD. To start WINSVD, choose Debug from the Tools menu of COBOL Project Manager.

Using the COBOL32 and LINK Commands

For release 8.1.6, the following commands can be used to build an executable:

```
COBOL32 -M sample1.cbl
LINK sample1.obj f3bicimp.lib libc.lib kernel32.lib user32.lib
/out:sample1.exe oracle_base\oracle_home \precomp\lib\orasql8.lib
```

For release 1.8.51, the following commands can be used to build an executable:

```
COBOL32 -M sample1.cbl
LINK sample1.obj f3bicimp.lib libc.lib kernel32.lib user32.lib
/out:sample1.exe oracle_base\oracle_home \precomp\lib\orasql8.lib
```

These commands produce sample1.exe, which can be executed like any other Windows NT or Windows 95/98 program.

For release 8.1.6, the following commands can be used to build an executable for debugging:

```
COBOL32 -M -Dt sample1.cbl
LINK sample1.obj f3bicimp.lib libc.lib kernel32.lib user32.lib
/out:sample1.exe oracle_base\oracle_home \precomp\lib\orasql8.lib
/DEBUG /DEBUGTYPE:COFF
```

For release 1.8.51, the following commands can be used to build an executable for debugging:

```
COBOL32 -M -Dt sample1.cbl
LINK sample1.obj f3bicimp.lib libc.lib kernel32.lib user32.lib
/out:sample1.exe oracle_base\oracle_home \precomp\lib\orasql8.lib
/DEBUG /DEBUGTYPE:COFF
```

These commands produce sample1.exe, as well as WINSVD debug information. Fujitsu COBOL applications can be debugged using the Interactive Debugger WINSVD.

MERANT Micro Focus Compiler

You can build and execute a MERANT Micro Focus COBOL application in two ways:

- Using the IDE (using NetExpress only)
- Using Animator (products other than NetExpress)
- Using the COBOL and CBLLINK Commands (all products)
- Using COBSQL

In each of these the COBSQL utility may be used with the following advantages:

- Pro*COBOL is run by the MERANT Micro Focus compiler and does not need to be run as a separate step.
- Animation is done using the .pco source file rather than the .cbl file produced by Pro*COBOL.
- The MAKEYSYN directive is provided automatically and need not be specified manually.

Using the IDE

A program generated by Pro*COBOL can be compiled and executed from within the MERANT Micro Focus NetExpress IDE. Simply add the .cbl file generated by Pro*COBOL to a Net Express project. To avoid potential inconsistencies when calling routines in the Oracle libraries the program should be compiled using the directive:

```
MAKESYN "COMP-5" = "COMP"
```

This directive can be specified in the build setting for the source file, the project settings or via a $SET line at the start of the source file. When you select **Rebuild** or **Rebuild All** the IDE generates an executable ready to Run or Animate.

Using Animator

Programs can be compiled and executed from within the MERANT Micro Focus COBOL debugger, Animator V2.

To avoid potential inconsistencies when calling routines in the Oracle libraries, select the menu option Compiler Directives, and enter:

```
MAKESYN "COMP-5" = "COMP"
```

This step is required because MERANT Micro Focus COBOL stores binary numbers in Big Endian format. Oracle libraries expect binary numbers to be stored in Little Endian format (machine format).

Using the COBOL and CBLLINK Commands

COBOL and CBLLINK can be used to build programs can be in two ways, depending on whether the Pro*COBOL runtime is to be statically linked or accessed through a DLL at runtime.

For dynamic linking the commands are:

```
COBOL sample1 /MAKESYN"COMP-5"="COMP";
CBLLINK sample1
```

For static linking Pro*COBOL 8.1.6 the commands are:

```
COBOL sample1 /LITLINK /MAKESYN"COMP-5"="COMP";
CBLLINK sample1 oracle_base\oracle_home \precomp\lib\orasql8.lib
```

For static linking Pro*COBOL 1.8.51 the commands are:

```
COBOL sample1 /LITLINK /MAKESYN"COMP-5"="COMP";
CBLLINK sample1 oracle_base\oracle_home \precomp\lib\orasql8.lib
```

The previous commands produce `sample1.exe`, which can be executed like any other Windows NT or Windows 95/98 program.

> **Note:** MERANT Micro Focus COBOL must be installed on the same system as Pro*COBOL to successfully execute the file.

Using COBSQL

COBSQL can be used to simplify preprocessing and debugging. To use COBSQL, specify the following directive to the COBOL compiler:

```
PREPROCESS(COBSQL) COBSQLTYPE=ORACLE8 ENDP
```

or the short form:

```
P(COBSQL) CSQLT=ORA8 ENDP
```

COBSQLTYPE should be set to ORACLE or ORA for versions of Pro*COBOL prior to release 8.0. The directive may be set with a $SET line at the start of the source file, on the COBOL command line, in program build settings or project settings for NetExpress, or with SQL compiler directives settings for Animator. At compile time, COBSQL runs Pro*COBOL as a background task and passes its output to the COBOL compiler together with additional information required to enable Animator to track execution using the .pco file rather than .cbl file.

When using COBSQL there is no need to deal directly with the .cbl file. Instead, add the .pco file to a NetExpress project, or open it with Animator.

Sample Programs

Oracle provides sample programs to demonstrate the use of Pro*COBOL with Oracle database features. See "Sample Files" on page 2-10 for a listing of these programs.

This section describes how to use the basic precompiling, compiling, and linking commands to build the sample programs. This section also describes the preparations required for running the Pro*COBOL sample programs.

Building the Demonstration Tables

To run the Pro*COBOL sample programs, you must have a database account with the user name SCOTT and the password TIGER. If this account does not exist on your database, create one before running the sample programs.

The SCOTT account must contain the EMP and DEPT tables. If the account does not contain these tables, use the demobld.sql script to create them.

To run the demobld.sql script:

1. Start SQL*Plus.

2. Connect to the database as user name SCOTT with password TIGER.

3. Run the demobld.sql script. For example:

   ```
   SQL> @ORACLE_BASE\ORACLE_HOME\SQLPLUS\DEMO\DEMOBLD.SQL
   ```

Building the Sample Programs

Pro*COBOL supplies batch files for building the sample files:

- `fjmakeit.bat` for Fujitsu COBOL
- `makeit.bat` for MERANT Micro Focus COBOL.

For release 8.1.6, the batch files are located in *oracle_base**oracle_home* \\precomp\\demo\\procob. For release 1.8.51, the files are located in *oracle_ base**oracle_home* \\precomp\\demo\\procob2.

To build the sample programs, run the batch files with any sample file. Do not provide the file extension. For example:

```
C:\ORACLE\ORA81\PRECOMP\DEMO\PROCOB2> fjmakeit sample1
C:\ORACLE\ORA81\PRECOMP\DEMO\PROCOB2> makeit sample1
```

If you encounter errors when building the sample programs, ensure that all paths and file names reflect the configuration of your system. The commands to run the sample programs assume that the following are the current working directories:

- *oracle_base**oracle_home* \\precomp\\demo\\procob2 directory for release 8.1.6
- *oracle_base**oracle_home* \\precomp\\demo\\procob directory for release 1.8.51

You may need to modify the sample link script to reflect the configuration of your system. See "Compiling and Linking Pro*COBOL Applications" on page 2-4 for more information.

Fujitsu Compiler

The `fjmakeit.bat` for release 8.1.6 contains the following:

```
procob  iname=%1.pco ireclen=132 maxliteral=160
cobol32 –M %1.cbl
link %1.obj f3bicimp.lib libc.lib kernel32.lib user32.lib
/out:%1.exe oracle_base\oracle_home \precomp\lib\orasql8.lib
```

For release 1.8.51, this batch file contains the following:

```
procob18 iname=%1.pco ireclen=132 maxliteral=160
cobol32 –M %1.cbl
link %1.obj f3bicimp.lib libc.lib kernel32.lib user32.lib
/out:%1.exe oracle_base\oracle_home \precomp\lib\orasql8.lib
```

MERANT Micro Focus Compiler

The `makeit.bat` for release 8.1.6 contains the following:

```
procob iname=%1.pco ireclen=132
cobol %1 /anim /litlink makesyn "COMP-5" = "COMP";
cbllink %1 /M%1 oracle_base\oracle_home \precomp\lib\orasql8.lib
```

For release 1.8.51, this batch file contains the following:

```
procob18 iname=%1.pco ireclen=132
cobol %1 /ganim /litlink makesyn "COMP-5" = "COMP";
cbllink %1 /M%1 oracle_base\oracle_home \precomp\lib\orasql8.lib
```

Sample Files

The Pro*COBOL sample files listed in Table 2–1, "Pro*COBOL Sample Programs" are located in the *oracle_base**oracle_home* \precomp\demo\procob2 (release 8.1.6) and/or *oracle_base**oracle_home* \precomp\demo\procob (release 1.8.51) directories. The SQL scripts are located in the *oracle_base**oracle_home* \precomp\demo\sql directory.

Table 2–1   Pro*COBOL Sample Programs

Sample Program	Description
sample1.pco	Simple query
sample2.pco	Cursor operations
sample3.pco	Host tables
sample4.pco	Datatype equivalence
sample6.pco	Dynamic SQL Method 1
sample7.pco	Dynamic SQL Method 2
sample8.pco	Dynamic SQL Method 3
sample9.pco calldemo.sql	Stored procedure call
sample10.pco	Dynamic SQL Method 4
sample11.pco sample11.sql	Cursor variable operations
sample12.pco	Dynamic SQL Method 4 using ANSI dynamic SQL

Sample Program	Description
sample13.pco	Nested program
sampleco.pco	Simple query and insert
sample14.pco	Host table x (release 8.1.6 only)
lobdemo1.pco	LOB datatypes (release 8.1.6 only)
lobdemo1.sql	LOB datatypes (release 8.1.6 only)

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