INTEGRATED INFORMATION SUPPORT SYSTEM (IISS)
Volume V - Common Data Model Subsystem
Part 10 - NDL Precompiler Control Module Product Specification

General Electric Company
Production Resources Consulting
One River Road
Schenectady, New York 12345

November 1985

Approved for public release; distribution is unlimited.

PREPARED FOR:
MATERIALS LABORATORY
AIR FORCE WRIGHT AERONAUTICAL LABORATORIES
AIR FORCE SYSTEMS COMMAND
WRIGHT-PATTERSON AFB, OH 45433-6533
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This technical report has been reviewed and is approved for publication.

[Signature]
David L. Judson, Project Manager
AFWAL/MLTC
Wright Patterson AFB OH 45433

5 Aug 1986

FOR THE COMMANDER:

[Signature]
Gerald C. Shumaker, Branch Chief
AFWAL/MLTC
Wright Patterson AFB OH 45433

7 Aug 86

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Copies of this report should not be returned unless return is required by security considerations, contractual obligations, or notice on a specific document."
This document is the product specification establishing the design implementation of the IISS Configuration Item PREO which will control other components of the Neutral Data Manipulation Language (NDML) precompiler.
Title

Integrated Information Support System (IISS)
Vol V - Common Data Model Subsystem
Part 10 - NDL Precompiler Control Module Product Specification

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PREFACE

This product specification covers the work performed under Air Force Contract F33615-80-C-5155 (ICAM Project 6201). This contract is sponsored by the Materials Laboratory, Air Force Systems Command, Wright-Patterson Air Force Base, Ohio. It was administered under the technical direction of Mr. Gerald C. Shumaker, ICAM Program Manager, Manufacturing Technology Division, through Project Manager, Mr. David Judson. The Prime Contractor was Production Resources Consulting of the General Electric Company, Schenectady, New York, under the direction of Mr. Alan Rubenstein. The General Electric Project Manager was Mr. Myron Hurlbut of Industrial Automation Systems Department, Albany, New York.

Certain work aimed at improving Test Bed Technology has been performed by other contracts with Project 6201 performing integrating functions. This work consisted of enhancements to Test Bed software and establishment and operation of Test Bed hardware and communications for developers and other users. Documentation relating to the Test Bed from all of these contractors and projects have been integrated under Project 6201 for publication and treatment as an integrated set of documents. The particular contributors to each document are noted on the Report Documentation Page (DD1473). A listing and description of the entire project documentation system and how they are related is contained in document FTR620100001, Project Overview.

The subcontractors and their contributing activities were as follows:

TASK 4.2

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<thead>
<tr>
<th>Subcontractors</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boeing Military Aircraft Company (BMAC)</td>
<td>Reviewer</td>
</tr>
<tr>
<td>D. Appleton Company (DACOM)</td>
<td>Responsible for IDEF support, state-of-the-art literature search</td>
</tr>
<tr>
<td>General Dynamics/ Ft. Worth</td>
<td>Responsible for factory view function and information models</td>
</tr>
<tr>
<td>Subcontractors</td>
<td>Role</td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>Illinois Institute of Technology</td>
<td>Responsible for factory view function research (IITRI) and information models of small and medium-size business</td>
</tr>
<tr>
<td>North American Rockwell</td>
<td>Reviewer</td>
</tr>
<tr>
<td>Northrop Corporation</td>
<td>Responsible for factory view function and information models</td>
</tr>
<tr>
<td>Pritsker and Associates</td>
<td>Responsible for IDEF2 support</td>
</tr>
<tr>
<td>SoftTech</td>
<td>Responsible for IDEF0 support</td>
</tr>
</tbody>
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**TASKS 4.3 - 4.9 (TEST BED)**

<table>
<thead>
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<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boeing Military Aircraft Company (BMAC)</td>
<td>Responsible for consultation on applications of the technology and on IBM computer technology.</td>
</tr>
<tr>
<td>Computer Technology Associates (CTA)</td>
<td>Assisted in the areas of communications systems, system design and integration methodology, and design of the Network Transaction Manager.</td>
</tr>
<tr>
<td>Control Data Corporation (CDC)</td>
<td>Responsible for the Common Data Model (CDM) implementation and part of the CDM design (shared with DACOM).</td>
</tr>
<tr>
<td>D. Appleton Company (DACOM)</td>
<td>Responsible for the overall CDM Subsystem design integration and test plan, as well as part of the design of the CDM (shared with CDC). DACOM also developed the Integration Methodology and did the schema mappings for the Application Subsystems.</td>
</tr>
</tbody>
</table>
Subcontractors

Digital Equipment Corporation (DEC)

McDonnell Douglas Automation Company (McAuto)

On-Line Software International (OSI)

Rath and Strong Systems Products (RSSP) (In 1985 became McCormack & Dodge)

SofTech, Inc.

Software Performance Engineering (SPE)

Structural Dynamics Research Corporation (SDRC)

Role

Consulting and support of the performance testing and on DEC software and computer systems operation.

Responsible for the support and enhancements to the Network Transaction Manager Subsystem during 1984/1985 period.

Responsible for programming the Communication Subsystem on the IBM and for consulting on the IBM.

Responsible for assistance in the implementation and use of the MRP II package (PIOS) that they supplied.

Responsible for the design and implementation of the Network Transaction Manager (NTH) in 1981/1984 period.

Responsible for directing the work on performance evaluation and analysis.

Responsible for the User Interface and Virtual Terminal Interface Subsystems.

Prime contractors under other projects who have contributed to Test Bed Technology, their contributing activities and responsible projects are as follows:

<table>
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<th>Contractors</th>
<th>ICAM Project</th>
<th>Contributing Activities</th>
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<td>Boeing Military Aircraft Company (BMAC)</td>
<td>1701, 2201, 2202</td>
<td>Enhancements for IBM node use. Technology Transfer to Integrated Sheet Metal Center (ISMC)</td>
</tr>
<tr>
<td>Contractors</td>
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<td>-------------------------------------</td>
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<td>-----------------------------------------------------------------------------------------</td>
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<tr>
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<td>1502, 1701</td>
<td>IISS enhancements to Common Data Model Processor (CDMP)</td>
</tr>
<tr>
<td>D. Appleton Company (DACOM)</td>
<td>1502</td>
<td>IISS enhancements to Integration Methodology</td>
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<tr>
<td>General Electric</td>
<td>1502</td>
<td>Operation of the Test Bed and communications equipment.</td>
</tr>
<tr>
<td>Hughes Aircraft Company (MAC)</td>
<td>1701</td>
<td>Test Bed enhancements</td>
</tr>
<tr>
<td>Structural Dynamics Research Corporation (SDRC)</td>
<td>1502, 1701, 1703</td>
<td>IISS enhancements to User Interface/Virtual Terminal Interface (UI/VTI)</td>
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</table>
1.1 Identification

This specification establishes the design of a number of software modules necessary for the precompiler that were not addressed in any of the NDML Precompiler Development Specification. They can be referred to as PREO, "NDML Control Modules", to be built and formally accepted by the ICAN Program Office. This CI constitutes one of the subsystems of the Common Data Model Processor (CDMP).

1.2 Functional Summary

This configuration item consists of the following software modules:

1. CDH01, APNAME
2. MAIN, CDPRE
3. CDECHE
4. RPTERR
5. CDP13

The purpose of Computer Program Configuration Item (CPCI) and a brief description of the major functions follows:

1. CDH01 is designated to be a queue server process that accesses an ORACLE database. It is accessed by a call to the module APNAME. It determines the next available name to use for a software module that is to be generated. It is also accessed by a call to module RUMOD to signal reuse of a software module during error recovery.

2. MAIN and CDPRE are designed to be the user interface entry point and top level NDML precompiler control module respectively. At this time, the user interface is the NDML precompiler and is designed to be a simple batch-oriented COBOL program. The inputs to the precompiler are "ACCEPTED" from a single file and the
outputs (the identification of generated code) are "DISPLAY" output. This user interface main, after having assembled the input, then calls CDPRE. CDPRE is the callable entry point to the precompiler itself. The precompiler has been made a callable routine to support many other user interfaces as yet unbuilt. CDPRE is essentially a control routine of other designed CPCI's of the NDML precompiler. It executes a loop while over the user input file. This allows for many user modules of a single logical unit of work to be precompiled at the same time (a requirement of the current design). After each user module is precompiled, CDECHK is called to perform any error handling chores. At the end of the user's batch, CDPl4 (PRE14) is accessed to generate the necessary request processor main routines.

3. CDECHK is a module that localizes all error checking and handling for the precompilation of a single user module. If the precompile was successful, a record of all generated code is stored on the CDM ORACLE database. If unsuccessful, all module names assigned and generated during the precompilation process must be marked as re-useable.

4. A generalized routine, RPTERR, is used to report user errors during precompilation. This writes the specific message into an error file that contains all user input code along with the interspersed error messages in much the same way as a standard COBOL compiler.

5. CDPl3 is a module designed to control all code generation activities of the precompiler. It is called by PRE5. Input to CDPl3 consists of the logical specifications for each subtransaction to be generated. For each subtransaction, APNAME is called to get a new name for the module to be generated for a query. PRE8 is called to generate the CS to ES transformer. PRE10 is called to generate code into the user's AP. Also, one of the DBMS specific code generator's is called based upon the type of DBMS the subtransaction must access.
SECTION 2

DOCUMENTS

2.1 Reference Documents


2.2 Terms and Abbreviations

Attribute Use Class: (AUC)

Conceptual Schema: (CS)

Common Data Model Processor: (CDMP)

Common Data Model: (CDM) Describes common data application process formats, form definitions, etc., of the IISS and includes conceptual schema, external, internal schemas, and schema transformation operators.

Data Field: (DF) An element of data in the external schema. It
is by this name that an NDMML programmer references data.

**Database Management System:** (DBMS)

**Distributed Request Supervisor:** (DRS) This IISS CDM subsystem configuration item controls the execution of distributed NDMML queries and non-distributed updates.

**Domain:** A logical definition of legal attribute class values.

**Domain Constraint:** Predicate that applies to a single domain.

**External Schema:** (ES)

**Forms:** Structured views which may be imposed on windows or other forms. A form is composed of fields where each field is a form, item, or window.

**Forms Processor:** (FP) A set of callable execution time routines available to an application program for form processing.

**Internal Schema:** (IS)

**Integrated Information Support System:** (IISS) A test computing environment used to investigate, demonstrate and test the concepts of information management and information integration in the context of Aerospace Manufacturing. The IISS addresses the problems of integration of data resident on heterogeneous databases supported by heterogeneous computers interconnected via a local Area Network.

**Mapping:** The correspondence of independent objects in two schemas: ES to CS or CS to IS.

**Network Transaction Manager:** (NTM) Performs the coordination, communication and housekeeping functions required to integrate the application processes and system services resident on the various hosts into a cohesive system.

**Neutral Data Manipulation Language:** (NDML) A language developed by the IISS project to provide uniform access to common data, regardless of database manager or distribution criteria. It provides distributed retrieved and single node updates.

**ORACLE:** Relational DBMS based on the SQL (Structured Query Language, a product of ORACLE Corp., Menlo Park, CA). The CDM is an ORACLE database.
Parcel: A sequential file containing sections source code of the input application program.

Request Processor: (RP) A COBOL program that will satisfy a retrieval or update NDML subtransaction against a particular Database Management System.

User Interface: (UI) Controls the user's terminal and interfaces with the rest of the system.

Virtual Terminal Interface: (VTI) Performs the interfacing between different terminals and the UI. This is done by defining a specific set of terminal features and protocols which must be supported by UI software which constitutes the Virtual Terminal Definition. Specific terminals are then mapped against the Virtual Terminal software by specific software modules written for each type of real terminal supported.
SECTION 3

REQUIREMENTS

3.1 Structural Description

A graphic portrayal of this CPCI is included in Section 3.10. This chart shows the hierarchical relationship of each module making up this CPCI. Since only those modules of this CPCI are shown in Section 3.10, the user is referred to the diagrams of Section 3.3 to show how these modules control the CPCI's of the NDML precompiler.

3.2 Functional Flow

A single execution of the NDML precompiler may have many logical units of work, each consisting of a batch of user modules. MAIN controls this loop. Each batch consists of many user modules which may be precompiled successfully or unsuccessfully. This loop is controlled by CDPRE. Error handling logic, for each user module, is controlled by CDECHK. Many NDML statements may be found in each user module. This logic is controlled by PRE2. Each NDML statement may require many conceptual transactions (the original request plus any integrity tests) which is controlled by PRE4. Each conceptual transaction may require many internal schema subtransactions. This is determined by PRE5. The generation of code for each subtransaction is controlled by CDPI3.

3.3 Interfaces

Figure 3-1 depicts the interface of PRE0 with other CPCI's in the system.
Figure 3-1. Interface of PRE0 with Other CPCI's
3.3.1 Inputs/Outputs

The following tables depict the inputs and outputs of each module in this CPC1. A detailed description for each item can be found in the DS for this CPC1.

**MODULE: CD101**

<table>
<thead>
<tr>
<th>INPUT</th>
<th>OUTPUT</th>
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<tbody>
<tr>
<td>--NONE--</td>
<td></td>
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**MODULE: APNAME**

<table>
<thead>
<tr>
<th>INPUT</th>
<th>OUTPUT</th>
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</thead>
<tbody>
<tr>
<td>DBMS Name</td>
<td>Application Process Name Module Status</td>
</tr>
</tbody>
</table>

**MODULE: CDPRE**

<table>
<thead>
<tr>
<th>INPUT</th>
<th>OUTPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application Process Input File Error File</td>
<td>Code Generator Table Number of Good Precompiles</td>
</tr>
<tr>
<td>Application Process Target Host</td>
<td>Number of Bad Precompiles</td>
</tr>
<tr>
<td>Users Application Process Name</td>
<td>Module Status</td>
</tr>
</tbody>
</table>

**MODULE: CDECHK**

<table>
<thead>
<tr>
<th>INPUT</th>
<th>OUTPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precompile Status Last Module Used Users Module Name Current Host Target Host Parcel 1 Parcel 2 Parcel 3</td>
<td>Module Status</td>
</tr>
</tbody>
</table>
Parcel 4
Source Language
Code Generator
Oracle Logon Data Area

3.4 Program Interrupts
Not applicable to this CPCI.

3.5 Timing and Sequencing Description
Not applicable to this CPCI.

3.6 Special Control Features
Not applicable to this CPCI.

3.7 Storage Allocation

3.7.1 Database Definition
The database used by this CPCI is the Common Data Model (CDM) database. This model is defined by the CDIK, the IDEF1 model of the CDM, Reference Number 3.

3.7.1.1 File Description
No permanent files have been defined for this CPCI. It may use temporary scratch files for such things as generated program source code or temporary query results.

3.7.1.2 Table Description
Not applicable to this CPCI.

3.7.1.3 Item Description
Not applicable to this CPCI.

3.8 Object Code Creation
The object code for this CPCI will be created by the system integration test team by using defined IIS5 Software Configuration Management Procedures. This CPCI will use the COBOL language compiler.
3.9 Adaptation Data

This CPCI has been coded using ANSI COBOL. The intent was to provide a transportable system. Any system environment supporting this language, a virtual memory management scheme, the COMM and NTM subsystem of IISS and the ORACLE Database Management System should be able to support this CPCI. Every possible attempt has been made to localize and identify any machine or environment dependent modules through the original design of the IISS and application of Configuration Management Procedures.

3.10 Detail Design Description

The following sections have been computer generated for this CPCI.

3.10.1 Main Program List

The following is a list of all "Main Programs" which are modules that are not called by any other module being documented here. These modules are either program entry points or, if they are hooked into another set of programs via subroutine calls, they are the points the external programs can call and therefore enter through. To differentiate between the two types of entry points, look at the individual Module Documentation (section 3.10.8) and look at Module Type for each of the Main Program modules listed. Note whether the routine is a Program, Subroutine, or Function. If it is a Program, it is truly a main program entry point. If not, then it is merely called by other programs not being documented here.
<table>
<thead>
<tr>
<th>Module Name</th>
<th>Purpose</th>
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</thead>
<tbody>
<tr>
<td>CDMO1</td>
<td>CONTROLS ALL REQUESTS FOR MODULE NAMES</td>
</tr>
<tr>
<td>CDP13</td>
<td>CONTROLS REQUEST PROCESSOR CODE GENERATION</td>
</tr>
<tr>
<td>MAIN</td>
<td>PROGRAM NAME NDML MAIN AND UI</td>
</tr>
<tr>
<td>OPNFIL</td>
<td>THIS ROUTINE OPENS AN OUTPUT FILE.</td>
</tr>
<tr>
<td>STRMOV</td>
<td>MOVE THE STRING TO THE POOL</td>
</tr>
<tr>
<td>SUBMOV</td>
<td>FACILITATE A SUB-STRING MOVE</td>
</tr>
</tbody>
</table>
3.10.2 Module List

The following is a list of all the modules being documented here along with their purpose. Each module has a unique name, no matter what language it was written in.
### PRECOMPILER CONTROL Module List

<table>
<thead>
<tr>
<th>Module Name</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>APNAME</td>
<td>INTERFACES WITH THE MODULE NAME QUEUE SERVER</td>
</tr>
<tr>
<td>CDDGAP</td>
<td>DELETE GENERATED AP ROWS IN THE GAP TABLES IN THE CDM</td>
</tr>
<tr>
<td>CDECHK</td>
<td>PROVIDE PRECOMPILER ERROR CHECKING</td>
</tr>
<tr>
<td>CDIGAP</td>
<td>CDIGAP INSERTS A ROW IN THE GENERATED AP TABLE.</td>
</tr>
<tr>
<td>CDMO1</td>
<td>CONTROLS ALL REQUESTS FOR MODULE NAMES</td>
</tr>
<tr>
<td>CDP13</td>
<td>CONTROLS REQUEST PROCESSOR CODE GENERATION</td>
</tr>
<tr>
<td>CDPRE</td>
<td>CDPRE MAIN ENTRY POINT FOR THE NDML PRECOMPILER</td>
</tr>
<tr>
<td>MAIN</td>
<td>PROGRAM NAME NDML MAIN AND UI</td>
</tr>
<tr>
<td>OPNFIL</td>
<td>THIS ROUTINE OPENS AN OUTPUT FILE.</td>
</tr>
<tr>
<td>RCMOD</td>
<td>MARK PREVIOUSLY ASSIGNED MODULES AS REUSABLE</td>
</tr>
<tr>
<td>RPTERR</td>
<td>OUTPUT PRECOMPILER ERROR MESSAGES TO AP LISTING</td>
</tr>
<tr>
<td>RUMOD</td>
<td>SIGNAL REUSE OF A MODULE</td>
</tr>
<tr>
<td>STRMOV</td>
<td>MOVE THE STRING TO THE POOL</td>
</tr>
<tr>
<td>SUBMOV</td>
<td>FACILITATE A SUB-STRING MOVE</td>
</tr>
</tbody>
</table>
3.10.3 External Routines List

The following is a list of all routines or functions not documented here that are called by modules that are documented here. The first caller, in alphabetical order, is listed as well. The specification in which any module is documented may be found in the Module Documentation Index (Document Number CM 620100001). See section 3.10.6 for a list of the modules that call each of these external routines.
# PRECOMPILER CONTROL External Routines List

<table>
<thead>
<tr>
<th>Module Name</th>
<th>First User</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDFUNC</td>
<td>APNAME</td>
</tr>
<tr>
<td>CDP10</td>
<td>GDP13</td>
</tr>
<tr>
<td>CDP12</td>
<td>CDPRE</td>
</tr>
<tr>
<td>CDP14</td>
<td>CDPRE</td>
</tr>
<tr>
<td>CDPRE1</td>
<td>CDPRE</td>
</tr>
<tr>
<td>CDPRE2</td>
<td>CDPRE</td>
</tr>
<tr>
<td>CDPRE7</td>
<td>CDP13</td>
</tr>
<tr>
<td>CDPRE8</td>
<td>CDP13</td>
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<tr>
<td>CDPRE9</td>
<td>CDP13</td>
</tr>
<tr>
<td>CDPQC</td>
<td>CDP13</td>
</tr>
<tr>
<td>CDQPO</td>
<td>CDP13</td>
</tr>
<tr>
<td>CDQPT</td>
<td>CDP13</td>
</tr>
<tr>
<td>CLSERR</td>
<td>CDPRE</td>
</tr>
<tr>
<td>DELFIL</td>
<td>CDECHK</td>
</tr>
<tr>
<td>ERRPRO</td>
<td>APNAME</td>
</tr>
<tr>
<td>FOPEN</td>
<td>OPNFIL</td>
</tr>
<tr>
<td>INITIAL</td>
<td>CDM01</td>
</tr>
<tr>
<td>INITEX</td>
<td>MAIN</td>
</tr>
<tr>
<td>MSEND</td>
<td>APNAME</td>
</tr>
<tr>
<td>OBINDW</td>
<td>CDIGAP</td>
</tr>
<tr>
<td>OCLOSE</td>
<td>CDIGAP</td>
</tr>
<tr>
<td>OCOM</td>
<td>CDM01</td>
</tr>
<tr>
<td>ODFINN</td>
<td>CDM01</td>
</tr>
<tr>
<td>OEXEC</td>
<td>CDDGAP</td>
</tr>
<tr>
<td>OFETCH</td>
<td>CDM01</td>
</tr>
<tr>
<td>OLOGOF</td>
<td>CDM01</td>
</tr>
<tr>
<td>OLM</td>
<td>CDPRE</td>
</tr>
<tr>
<td>OOPEN</td>
<td>CDDGAP</td>
</tr>
<tr>
<td>OPNERR</td>
<td>CDPRE</td>
</tr>
<tr>
<td>OPMINPT</td>
<td>CDPRE</td>
</tr>
<tr>
<td>OROL</td>
<td>CDPRE</td>
</tr>
<tr>
<td>OSQL3</td>
<td>CDDGAP</td>
</tr>
<tr>
<td>PRINTF</td>
<td>OPNFIL</td>
</tr>
<tr>
<td>QSEND</td>
<td>CDM01</td>
</tr>
<tr>
<td>RCV</td>
<td>CDM01</td>
</tr>
<tr>
<td>REDINPT</td>
<td>CDPRE</td>
</tr>
<tr>
<td>TRNMAT</td>
<td>CDM01</td>
</tr>
<tr>
<td>UNPLINE</td>
<td>CDPRE</td>
</tr>
<tr>
<td>WRITERR</td>
<td>CDPRE</td>
</tr>
</tbody>
</table>

3-10
3.10.4 Include File List

The following is a list of all include files called in by modules being documented here. Each include file has a unique name regardless of the language being used. The purpose of each include file is listed as well. A more complete description of each include file is given in section 3.10.9. The purpose listed is the one that is in the source code of the include file.

A purpose of "***** PURPOSE NOT FOUND BY STRIPPER *****" indicates that a purpose statement was not written into the include file itself. The most common reason for this is that the include file comes from system libraries that were not developed by the project, such as 'C' libraries that are provided with the 'C' compiler.

See section 3.10.6 for a set of lists which show all the modules which call in each of these include files.
# PRECOMPILER CONTROL Include File List

<table>
<thead>
<tr>
<th>File Name</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALFABET</td>
<td>LETTERS CONTAINED IN THE ENGLISH ALPHABET</td>
</tr>
<tr>
<td>APAT</td>
<td>ACCESS PATH TABLE</td>
</tr>
<tr>
<td>APGC</td>
<td>GENERIC CODASYL COMMAND TABLE</td>
</tr>
<tr>
<td>APINFO</td>
<td>ACCESS PATH INFORMATION TABLE</td>
</tr>
<tr>
<td>APL</td>
<td>JOIN QUERY ATTRIBUTE PAIR LIST</td>
</tr>
<tr>
<td>APRK</td>
<td>TABLE OF RECORD KEYS FOR CODASYL ACCESS PATHS</td>
</tr>
<tr>
<td>CEWORK</td>
<td>CS TO ES WORK LIST INFORMATION</td>
</tr>
<tr>
<td>CGTABLE</td>
<td>CODE GENERATING TABLE- TRACKS ALL GENERATED SOFTWARE</td>
</tr>
<tr>
<td>CHKCDM</td>
<td>IISS CDMP CHECK STATUS CODES</td>
</tr>
<tr>
<td>CSAL</td>
<td>CONCEPTUAL SCHEMA ACTION LIST</td>
</tr>
<tr>
<td>CSQUAL</td>
<td>CONCEPTUAL SCHEMA QUALIFY LIST</td>
</tr>
<tr>
<td>ERRCDM</td>
<td>IISS ERROR STATUS CODES FOR CDMP MODULES</td>
</tr>
<tr>
<td>ERRPRO</td>
<td>PROCESS ERROR INCLUDE FILE</td>
</tr>
<tr>
<td>ESAL</td>
<td>EXTERNAL SCHEMA ACTION LIST</td>
</tr>
<tr>
<td>ESQUAL</td>
<td>EXTERNAL SCHEMA QUALIFY LIST</td>
</tr>
<tr>
<td>FILSTAT</td>
<td>VARIABLE DEFINITION FOR FILE STATUS</td>
</tr>
<tr>
<td>ISAL</td>
<td>INTERNAL SCHEMA ACTION LIST</td>
</tr>
<tr>
<td>ISQUAL</td>
<td>INTERNAL SCHEMA QUALIFY LIST</td>
</tr>
<tr>
<td>JQGTEBL</td>
<td>JOIN QUERY GRAPH TELLS HOW TO CONNECT SUBTRANSACTIONS</td>
</tr>
<tr>
<td>ORCLEDAD</td>
<td>WS DEFINITION FOR THE ORACLE LOGIN AREA</td>
</tr>
<tr>
<td>RFTABLE</td>
<td>THE RESULT FIELD TABLE</td>
</tr>
<tr>
<td>SETTAB</td>
<td>LIST OF SETS OWNER-MEMBER RELATIONSHIPS</td>
</tr>
<tr>
<td>SRVRET</td>
<td>AS THE RETURN GIVEN A TABLE-FULL ERROR</td>
</tr>
<tr>
<td>STDIO</td>
<td>**** PURPOSE NOT FOUND BY STRIPPER ****</td>
</tr>
<tr>
<td>SUBPROC</td>
<td>SUBTRANSACTION PROCESSES ID TABLE</td>
</tr>
<tr>
<td>UVABBR</td>
<td>USER VIEW ABBREVIATION LIST</td>
</tr>
</tbody>
</table>

3-12
3.10.5 Where Include File Used List

The following lists each include file from 3.10.4 and all the modules documented in this specification which include them. The purpose of each module is listed as well.
<table>
<thead>
<tr>
<th>Include File</th>
<th>Module Name</th>
<th>Module Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALFABET</td>
<td>CDM01</td>
<td>CONTROLS ALL REQUESTS FOR MODULE NAMES</td>
</tr>
<tr>
<td>APAT</td>
<td>CDP13</td>
<td>CONTROLS REQUEST PROCESSOR CODE GENERATION</td>
</tr>
<tr>
<td>APGC</td>
<td>CDP13</td>
<td>CONTROLS REQUEST PROCESSOR CODE GENERATION</td>
</tr>
<tr>
<td>APINFO</td>
<td>CDP13</td>
<td>CONTROLS REQUEST PROCESSOR CODE GENERATION</td>
</tr>
<tr>
<td>APL</td>
<td>CDP13</td>
<td>CONTROLS REQUEST PROCESSOR CODE GENERATION</td>
</tr>
<tr>
<td>APRK</td>
<td>CDP13</td>
<td>CONTROLS REQUEST PROCESSOR CODE GENERATION</td>
</tr>
<tr>
<td>CWORK</td>
<td>CDP13</td>
<td>CONTROLS REQUEST PROCESSOR CODE GENERATION</td>
</tr>
</tbody>
</table>
PRECOMPILER CONTROL Where-include-file-used List

<table>
<thead>
<tr>
<th>Include File</th>
<th>Module Name</th>
<th>Module Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**CGTABLE**

- **CDECHK** PROVIDE PRECOMPILER ERROR CHECKING
- **CDP13** CONTROLS REQUEST PROCESSOR CODE GENERATION
- **CDPRE** CDPRE MAIN ENTRY POINT FOR THE NDML PRECOMPILER
- **MAIN** PROGRAM NAME NDML MAIN AND UI

**CHKCDM**

- **APNAME** INTERFACES WITH THE MODULE NAME QUEUE SERVER
- **CDDGAP** DELETE GENERATED AP ROWS IN THE GAP TABLES IN THE CDM
- **CDECHK** PROVIDE PRECOMPILER ERROR CHECKING
- **CDIGAP** CDIGAP INSERTS A ROW IN THE GENERATED AP TABLE.
- **CDM01** CONTROLS ALL REQUESTS FOR MODULE NAMES
- **CDP13** CONTROLS REQUEST PROCESSOR CODE GENERATION
- **CDPRE** CDPRE MAIN ENTRY POINT FOR THE NDML PRECOMPILER
- **MAIN** PROGRAM NAME NDML MAIN AND UI
- **RCMOD** MARK PREVIOUSLY ASSIGNED MODULES AS REUSABLE
- **RUMOD** SIGNAL REUSE OF A MODULE

**CSAL**

- **CDP13** CONTROLS REQUEST PROCESSOR CODE GENERATION
**PRECOMPILER CONTROL Where‐include‐file‐used List**

<table>
<thead>
<tr>
<th>Include File</th>
<th>Module Name</th>
<th>Module Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSQUAL</td>
<td>CDP13</td>
<td>CONTROLS REQUEST PROCESSOR CODE GENERATION</td>
</tr>
</tbody>
</table>

**ERRCDM**

<table>
<thead>
<tr>
<th>APNAME</th>
<th>INTERFACES WITH THE MODULE NAME QUEUE SERVER</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDDGAP</td>
<td>DELETE GENERATED AP ROWS IN THE GAP TABLES IN THE CDM</td>
</tr>
<tr>
<td>CDECHK</td>
<td>PROVIDE PRECOMPILER ERROR CHECKING</td>
</tr>
<tr>
<td>CDIGAP</td>
<td>CDIGAP INSERTS A ROW IN THE GENERATED AP TABLE.</td>
</tr>
<tr>
<td>CDM01</td>
<td>CONTROLS ALL REQUESTS FOR MODULE NAMES</td>
</tr>
<tr>
<td>CDP13</td>
<td>CONTROLS REQUEST PROCESSOR CODE GENERATION</td>
</tr>
<tr>
<td>CDPRE</td>
<td>CDPRE MAIN ENTRY POINT FOR THE NDML PRECOMPILER</td>
</tr>
<tr>
<td>MAIN</td>
<td>PROGRAM NAME NDML MAIN AND UI</td>
</tr>
<tr>
<td>RCMOD</td>
<td>MARK PREVIOUSLY ASSIGNED MODULES AS REUSABLE</td>
</tr>
<tr>
<td>RUMOD</td>
<td>SIGNAL REUSE OF A MODULE</td>
</tr>
</tbody>
</table>

**ERRPRO**

<table>
<thead>
<tr>
<th>APNAME</th>
<th>INTERFACES WITH THE MODULE NAME QUEUE SERVER</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDDGAP</td>
<td>DELETE GENERATED AP ROWS IN THE GAP TABLES IN THE CDM</td>
</tr>
<tr>
<td>CDECHK</td>
<td>PROVIDE PRECOMPILER ERROR CHECKING</td>
</tr>
<tr>
<td>CDIGAP</td>
<td>CDIGAP INSERTS A ROW IN THE GENERATED AP TABLE.</td>
</tr>
<tr>
<td>CDM01</td>
<td>CONTROLS ALL REQUESTS FOR MODULE NAMES</td>
</tr>
<tr>
<td>CDP13</td>
<td>CONTROLS REQUEST PROCESSOR CODE GENERATION</td>
</tr>
<tr>
<td>CDPRE</td>
<td>CDPRE MAIN ENTRY POINT FOR THE NDML PRECOMPILER</td>
</tr>
<tr>
<td>MAIN</td>
<td>PROGRAM NAME NDML MAIN AND UI</td>
</tr>
</tbody>
</table>

3-16
PRECOMPILER CONTROL Where-include-file-used List

<table>
<thead>
<tr>
<th>Include File</th>
<th>Module Name</th>
<th>Module Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCNOD</td>
<td>MARK PREVIOUSLY ASSIGNED MODULES AS REUSABLE</td>
<td></td>
</tr>
<tr>
<td>RPTERR</td>
<td>OUTPUT PRECOMPILER ERROR MESSAGES TO AP LISTING</td>
<td></td>
</tr>
<tr>
<td>RUMOD</td>
<td>SIGNAL REUSE OF A MODULE</td>
<td></td>
</tr>
</tbody>
</table>

ESAL

CDP13 CONTROLS REQUEST PROCESSOR CODE GENERATION

ESQUAL

CDP13 CONTROLS REQUEST PROCESSOR CODE GENERATION

FILSTAT

<table>
<thead>
<tr>
<th>Main Program Name</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAIN</td>
<td>PROGRAM NAME NDML MAIN AND UI</td>
</tr>
<tr>
<td>RPTERR</td>
<td>OUTPUT PRECOMPILER ERROR MESSAGES TO AP LISTING</td>
</tr>
</tbody>
</table>

ISAL

CDP13 CONTROLS REQUEST PROCESSOR CODE GENERATION

ISQUAL

CDP13 CONTROLS REQUEST PROCESSOR CODE GENERATION
PRECOMPILER CONTROL Where-includes-file-used List

<table>
<thead>
<tr>
<th>Include File</th>
<th>Module Name</th>
<th>Module Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>JQGTEL</td>
<td>CDP13</td>
<td>CONTROLS REQUEST PROCESSOR CODE GENERATION</td>
</tr>
<tr>
<td>ORCLEDA</td>
<td>CDDGAP</td>
<td>DELETE GENERATED AP ROWS IN THE GAP TABLES IN THE CDN</td>
</tr>
<tr>
<td></td>
<td>CDECHK</td>
<td>PROVIDE PRECOMPILER ERROR CHECKING</td>
</tr>
<tr>
<td></td>
<td>CDIGAP</td>
<td>CDIGAP INSERTS A ROW IN THE GENERATED AP TABLE.</td>
</tr>
<tr>
<td></td>
<td>CDMO1</td>
<td>CONTROLS ALL REQUESTS FOR MODULE NAMES</td>
</tr>
<tr>
<td></td>
<td>CDP15</td>
<td>CONTROLS REQUEST PROCESSOR CODE GENERATION</td>
</tr>
<tr>
<td></td>
<td>CDPRE</td>
<td>CDPRE MAIN ENTRY POINT FOR THE NDML PRECOMPILER</td>
</tr>
<tr>
<td>RFTABLE</td>
<td>CDP13</td>
<td>CONTROLS REQUEST PROCESSOR CODE GENERATION</td>
</tr>
<tr>
<td>SETTAB</td>
<td>CDP13</td>
<td>CONTROLS REQUEST PROCESSOR CODE GENERATION</td>
</tr>
<tr>
<td>SRVRET</td>
<td>APNAME</td>
<td>INTERFACES WITH THE MODULE NAME QUEUE SERVER</td>
</tr>
<tr>
<td></td>
<td>CDMO1</td>
<td>CONTROLS ALL REQUESTS FOR MODULE NAMES</td>
</tr>
</tbody>
</table>

3-18
PRECOMPILER CONTROL Where-include-file-used List

<table>
<thead>
<tr>
<th>Include File</th>
<th>Module Name</th>
<th>Module Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDPRE</td>
<td>CDPRE MAIN ENTRY POINT FOR THE NDML PRECOMPILER</td>
<td></td>
</tr>
<tr>
<td>MAIN</td>
<td>PROGRAM NAME NDML MAIN AND UI</td>
<td></td>
</tr>
<tr>
<td>RCHOD</td>
<td>MARK PREVIOUSLY ASSIGNED MODULES AS REUSABLE</td>
<td></td>
</tr>
<tr>
<td>RUNMOD</td>
<td>SIGNAL REUSE OF A MODULE</td>
<td></td>
</tr>
</tbody>
</table>

**STUDIO**

OPNFIL  THIS ROUTINE OPENS AN OUTPUT FILE.

**SUBPROC**

CDP13  CONTROLS REQUEST PROCESSOR CODE GENERATION

**UVABBR**

CDP13  CONTROLS REQUEST PROCESSOR CODE GENERATION
3.10.6 Where External Routine Used List

The following lists each external function or routine listed in 3.10.3 and all the documented modules which call it. The purpose of each module is listed as well.
### Precompiler Control Where-External-Routine-Used List

<table>
<thead>
<tr>
<th>System Module</th>
<th>Module Name</th>
<th>Module Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDFUNC</td>
<td>APNAME</td>
<td>Interfaces with the module name Queue Server</td>
</tr>
<tr>
<td></td>
<td>RCMOD</td>
<td>Mark previously assigned modules as reusable</td>
</tr>
<tr>
<td></td>
<td>RUNOD</td>
<td>Signal reuse of a module</td>
</tr>
<tr>
<td>CDP10</td>
<td>CDP15</td>
<td>Controls Request Processor Code Generation</td>
</tr>
<tr>
<td>CDP12</td>
<td>CDPRE</td>
<td>CDPRE Main Entry Point for the Ndml Precompiler</td>
</tr>
<tr>
<td>CDP14</td>
<td>CDPRE</td>
<td>CDPRE Main Entry Point for the Ndml Precompiler</td>
</tr>
<tr>
<td>CDPRE1</td>
<td>CDPRE</td>
<td>CDPRE Main Entry Point for the Ndml Precompiler</td>
</tr>
<tr>
<td>CDPRE2</td>
<td>CDPRE</td>
<td>CDPRE Main Entry Point for the Ndml Precompiler</td>
</tr>
<tr>
<td>CDPRE7</td>
<td>CDP13</td>
<td>Controls Request Processor Code Generation</td>
</tr>
</tbody>
</table>

3-21
## PRECOMPILER CONTROL Where-external-routine-used List

<table>
<thead>
<tr>
<th>System</th>
<th>Module</th>
<th>Module Name</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CDP13</td>
<td>CONTROLS REQUEST PROCESSOR CODE GENERATION</td>
<td></td>
</tr>
<tr>
<td>CDPRE8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CDPRE9</td>
<td>CDP13</td>
<td>CONTROLS REQUEST PROCESSOR CODE GENERATION</td>
<td></td>
</tr>
<tr>
<td>CDPRE9</td>
<td>CDP13</td>
<td>CONTROLS REQUEST PROCESSOR CODE GENERATION</td>
<td></td>
</tr>
<tr>
<td>CDQPG</td>
<td>CDP13</td>
<td>CONTROLS REQUEST PROCESSOR CODE GENERATION</td>
<td></td>
</tr>
<tr>
<td>CDQPO</td>
<td>CDP13</td>
<td>CONTROLS REQUEST PROCESSOR CODE GENERATION</td>
<td></td>
</tr>
<tr>
<td>CDQPT</td>
<td>CDP13</td>
<td>CONTROLS REQUEST PROCESSOR CODE GENERATION</td>
<td></td>
</tr>
<tr>
<td>CLSERR</td>
<td>CDPRE</td>
<td>MAIN ENTRY POINT FOR THE NDML PRECOMPILER</td>
<td></td>
</tr>
<tr>
<td>DELFIL</td>
<td>CDECK</td>
<td>PROVIDE PRECOMPILER ERROR CHECKING</td>
<td></td>
</tr>
<tr>
<td>ERRPRO</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3-22
PRECOMPILED CONTROL Where-external-routine-used List

<table>
<thead>
<tr>
<th>System</th>
<th>Module</th>
<th>Module Name</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>APNAME</td>
<td>INTERFACES WITH THE MODULE NAME QUEUE SERVER</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CDDGAP</td>
<td>DELETE GENERATED AP ROWS IN THE GAP TABLES IN THE CDM</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GDECHK</td>
<td>PROVIDE PRECOMPILED ERROR CHECKING</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CDIGAP</td>
<td>CDIGAP INSERTS A ROW IN THE GENERATED AP TABLE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CDMO1</td>
<td>CONTROLS ALL REQUESTS FOR MODULE NAMES</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CDP13</td>
<td>CONTROLS REQUEST PROCESSOR CODE GENERATION</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CDPRE</td>
<td>CDPRE MAIN ENTRY POINT FOR THE NDML PRECOMPILED</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MAIN</td>
<td>PROGRAM NAME NDML MAIN AND UI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RCMOD</td>
<td>MARK PREVIOUSLY ASSIGNED MODULES AS REUSABLE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RPTERR</td>
<td>OUTPUT PRECOMPILED ERROR MESSAGES TO AP LISTING</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RUMOD</td>
<td>SIGNAL REUSE OF A MODULE</td>
</tr>
</tbody>
</table>

FOPEN
OPNFIL THIS ROUTINE OPENS AN OUTPUT FILE.

INITIAL
CDMO1 CONTROLS ALL REQUESTS FOR MODULE NAMES

INITEX
MAIN PROGRAM NAME NDML MAIN AND UI

NSEND
APNAME INTERFACES WITH THE MODULE NAME QUEUE SERVER
RCMOD MARK PREVIOUSLY ASSIGNED MODULES AS REUSABLE
PRECOMPILER CONTROL Where-external-routine-used List

<table>
<thead>
<tr>
<th>System</th>
<th>Module Name</th>
<th>Module Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>-------</td>
<td>-------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Runod</td>
<td>SIGNAL REUSE OF A MODULE</td>
<td></td>
</tr>
</tbody>
</table>

**OBINDN**
- **CDDGAP** DELETE GENERATED AP ROWS IN THE GAP TABLES IN THE CDM
- **CDIGAP** CDIGAP INSERTS A ROW IN THE GENERATED AP TABLE.
- **CDMO1** CONTROLS ALL REQUESTS FOR MODULE NAMES

**OCLOSE**
- **CDDGAP** DELETE GENERATED AP ROWS IN THE GAP TABLES IN THE CDM
- **CDIGAP** CDIGAP INSERTS A ROW IN THE GENERATED AP TABLE.
- **CDMO1** CONTROLS ALL REQUESTS FOR MODULE NAMES

**OCOM**
- **CDMO1** CONTROLS ALL REQUESTS FOR MODULE NAMES
- **CDPRE** CDPRE MAIN ENTRY POINT FOR THE NDML PRECOMPILER

**ODFINN**
- **CDMO1** CONTROLS ALL REQUESTS FOR MODULE NAMES

**OEXEC**
- **CDDGAP** DELETE GENERATED AP ROWS IN THE GAP TABLES IN THE CDM
- **CDIGAP** CDIGAP INSERTS A ROW IN THE GENERATED AP TABLE.
- **CDMO1** CONTROLS ALL REQUESTS FOR MODULE NAMES

3-24
<table>
<thead>
<tr>
<th>System Module Name</th>
<th>Module Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFETCH CDM01</td>
<td>CONTROLS ALL REQUESTS FOR MODULE NAMES</td>
</tr>
<tr>
<td>OLOGOF CDM01</td>
<td>CONTROLS ALL REQUESTS FOR MODULE NAMES</td>
</tr>
<tr>
<td>CDPRE</td>
<td>CDPRE  MAIN ENTRY POINT FOR THE NDML PRECOMPILER</td>
</tr>
<tr>
<td>OLOW CDM01</td>
<td>CONTROLS ALL REQUESTS FOR MODULE NAMES</td>
</tr>
<tr>
<td>CDPRE</td>
<td>CDPRE  MAIN ENTRY POINT FOR THE NDML PRECOMPILER</td>
</tr>
<tr>
<td>OOPEN CDDGAP</td>
<td>DELETE GENERATED AP ROWS IN THE GAP TABLES IN THE CDM</td>
</tr>
<tr>
<td>CDIGAP</td>
<td>CDIGAP   INSERTS A ROW IN THE GENERATED AP TABLE.</td>
</tr>
<tr>
<td>CDM01</td>
<td>CONTROLS ALL REQUESTS FOR MODULE NAMES</td>
</tr>
<tr>
<td>OPERRR CDPRE</td>
<td>CDPRE  MAIN ENTRY POINT FOR THE NDML PRECOMPILER</td>
</tr>
<tr>
<td>OPNINPT CDPRE</td>
<td>CDPRE  MAIN ENTRY POINT FOR THE NDML PRECOMPILER</td>
</tr>
<tr>
<td>System</td>
<td>Module</td>
</tr>
<tr>
<td>--------</td>
<td>--------</td>
</tr>
<tr>
<td>-------</td>
<td>--------</td>
</tr>
<tr>
<td>OROL</td>
<td>CDPRE</td>
</tr>
<tr>
<td>OSQ13</td>
<td>CDDGAP</td>
</tr>
<tr>
<td></td>
<td>CDIGAP</td>
</tr>
<tr>
<td></td>
<td>CDM01</td>
</tr>
<tr>
<td>PRINTF</td>
<td>OPNFIL</td>
</tr>
<tr>
<td>QSEND</td>
<td>CDM01</td>
</tr>
<tr>
<td>RCV</td>
<td>APNAME</td>
</tr>
<tr>
<td></td>
<td>CDM01</td>
</tr>
<tr>
<td></td>
<td>RCMOD</td>
</tr>
<tr>
<td>REDINPT</td>
<td>CDPRE</td>
</tr>
</tbody>
</table>

3-26
PRECOMPILER CONTROL Where-external-routine-used List

<table>
<thead>
<tr>
<th>System Module</th>
<th>Module Name</th>
<th>Module Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRMNAT</td>
<td>CDM01</td>
<td>CONTROLS ALL REQUESTS FOR MODULE NAMES</td>
</tr>
<tr>
<td></td>
<td>MAIN</td>
<td>PROGRAM NAME</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NDML MAIN AND UI</td>
</tr>
<tr>
<td>UNPLINE</td>
<td>CDPRE</td>
<td>CDPRE MAIN ENTRY POINT FOR THE NDML</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PRECOMPILER</td>
</tr>
<tr>
<td>WRITERR</td>
<td>CDPRE</td>
<td>CDPRE MAIN ENTRY POINT FOR THE NDML</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PRECOMPILER</td>
</tr>
</tbody>
</table>
3.10.7 Main Program Parts List

The following lists each Main Program listed in 3.10.1 and all the modules which are called either by that module itself or by any of the documented modules which it calls. It is possible for a non-main module to be listed more than once if it is called by multiple modules. The called modules, in this case known as program parts, are marked as to whether they are documented here. If so, the phrase “well-defined module” appears by the module name, if not it is an “external routine”. The Purpose of the Main Program module is listed as well.
**PRECOMPILER CONTROL Main Program Parts List**

<table>
<thead>
<tr>
<th>Main Pgm Name</th>
<th>Module Name</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CDM01</td>
<td>CONTROLS ALL REQUESTS FOR MODULE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NAMES</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Module Name</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERRPRO</td>
<td>External routine</td>
</tr>
<tr>
<td>INITIAL</td>
<td>External routine</td>
</tr>
<tr>
<td>OBINDN</td>
<td>External routine</td>
</tr>
<tr>
<td>OCLOSE</td>
<td>External routine</td>
</tr>
<tr>
<td>OCOM</td>
<td>External routine</td>
</tr>
<tr>
<td>ODFINN</td>
<td>External routine</td>
</tr>
<tr>
<td>OEXEC</td>
<td>External routine</td>
</tr>
<tr>
<td>OFETCH</td>
<td>External routine</td>
</tr>
<tr>
<td>OLOGOF</td>
<td>External routine</td>
</tr>
<tr>
<td>OLOGOF</td>
<td>External routine</td>
</tr>
<tr>
<td>QSEND</td>
<td>External routine</td>
</tr>
<tr>
<td>RCV</td>
<td>External routine</td>
</tr>
<tr>
<td>TRMNAT</td>
<td>External routine</td>
</tr>
</tbody>
</table>
PRECOMPILED CONTROL Main Program Parts List

<table>
<thead>
<tr>
<th>Main Pgm Name</th>
<th>Module Name</th>
<th>Module Type</th>
</tr>
</thead>
</table>
| CDP13         | Purpose-->
|              | CONTROLS REQUEST PROCESSOR CODE GENERATION |
|               | APNAME      | Well-defined module |
|               | CDFUNC      | External routine    |
|               | CDP10       | External routine    |
|               | CDPRE7      | External routine    |
|               | CDPRE8      | External routine    |
|               | CDPRE9      | External routine    |
|               | CDQPC       | External routine    |
|               | CDQPO       | External routine    |
|               | CDQPT       | External routine    |
|               | ERRPRO      | External routine    |
|               | MSEND       | External routine    |
|               | RCV         | External routine    |
|               | RPTERR      | Well-defined module |

3-30
## PRECOMPILER CONTROL Main Program Parts List

<table>
<thead>
<tr>
<th>Main Pgm Name</th>
<th>Module Name</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAIN</td>
<td></td>
<td>Purpose—PROGRAM NAME AND UI</td>
</tr>
<tr>
<td>CDDGAP</td>
<td></td>
<td>Well-defined module</td>
</tr>
<tr>
<td>CDECHK</td>
<td></td>
<td>Well-defined module</td>
</tr>
<tr>
<td>CDFUNC</td>
<td></td>
<td>External routine</td>
</tr>
<tr>
<td>CDIGAP</td>
<td></td>
<td>Well-defined module</td>
</tr>
<tr>
<td>CDP12</td>
<td></td>
<td>External routine</td>
</tr>
<tr>
<td>CDP14</td>
<td></td>
<td>External routine</td>
</tr>
<tr>
<td>CDPRE</td>
<td></td>
<td>Well-defined module</td>
</tr>
<tr>
<td>CDPRE1</td>
<td></td>
<td>External routine</td>
</tr>
<tr>
<td>CDPRE2</td>
<td></td>
<td>External routine</td>
</tr>
<tr>
<td>CLSERR</td>
<td></td>
<td>External routine</td>
</tr>
<tr>
<td>DELFIL</td>
<td></td>
<td>External routine</td>
</tr>
<tr>
<td>ERRPRO</td>
<td></td>
<td>External routine</td>
</tr>
<tr>
<td>IMITEX</td>
<td></td>
<td>External routine</td>
</tr>
<tr>
<td>NSEND</td>
<td></td>
<td>External routine</td>
</tr>
<tr>
<td>OBINDN</td>
<td></td>
<td>External routine</td>
</tr>
<tr>
<td>OCLOSE</td>
<td></td>
<td>External routine</td>
</tr>
<tr>
<td>OCOM</td>
<td></td>
<td>External routine</td>
</tr>
<tr>
<td>OEXEC</td>
<td></td>
<td>External routine</td>
</tr>
<tr>
<td>OLOGOF</td>
<td></td>
<td>External routine</td>
</tr>
<tr>
<td>OLON</td>
<td></td>
<td>External routine</td>
</tr>
<tr>
<td>OOPEN</td>
<td></td>
<td>External routine</td>
</tr>
<tr>
<td>OPNERR</td>
<td></td>
<td>External routine</td>
</tr>
<tr>
<td>OPNINPT</td>
<td></td>
<td>External routine</td>
</tr>
<tr>
<td>OROL</td>
<td></td>
<td>External routine</td>
</tr>
<tr>
<td>OSQL3</td>
<td></td>
<td>External routine</td>
</tr>
<tr>
<td>RCHMOD</td>
<td></td>
<td>Well-defined module</td>
</tr>
<tr>
<td>RCV</td>
<td></td>
<td>External routine</td>
</tr>
<tr>
<td>REDINPT</td>
<td></td>
<td>External routine</td>
</tr>
<tr>
<td>RPTERR</td>
<td></td>
<td>Well-defined module</td>
</tr>
<tr>
<td>RUNMOD</td>
<td></td>
<td>Well-defined module</td>
</tr>
<tr>
<td>TRMNAT</td>
<td></td>
<td>External routine</td>
</tr>
<tr>
<td>UNPLINE</td>
<td></td>
<td>External routine</td>
</tr>
<tr>
<td>WRITERR</td>
<td></td>
<td>External routine</td>
</tr>
</tbody>
</table>
### PRECOMPILER CONTROL Main Program Parts List

<table>
<thead>
<tr>
<th>Main Pgm Name</th>
<th>Module Name</th>
<th>Module Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OPN FIL</td>
<td>Purpose: THIS ROUTINE OPENS AN OUTPUT FILE.</td>
</tr>
<tr>
<td></td>
<td>FOPEN</td>
<td>External routine</td>
</tr>
<tr>
<td></td>
<td>PRINTF</td>
<td>External routine</td>
</tr>
</tbody>
</table>
### 3.10.8 Module Documentation

The following documentation describes information which is specific to each individual module being documented in this specification as listed in section 3.10.2. It provides a compact way of getting information that would be otherwise buried within each module’s source code.

The specific items in this module documentation have the following meanings:

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAME:</td>
<td>Name of program Module.</td>
</tr>
<tr>
<td>PURPOSE:</td>
<td>Purpose of Module as detailed in the source code.</td>
</tr>
<tr>
<td>LANGUAGE:</td>
<td>Programming language source code is written in.</td>
</tr>
<tr>
<td></td>
<td>The choices are:</td>
</tr>
<tr>
<td></td>
<td>VAX-11 FORTRAN</td>
</tr>
<tr>
<td></td>
<td>C (I/S-1 Workbench 'C')</td>
</tr>
<tr>
<td></td>
<td>VAX-11 COBOL</td>
</tr>
<tr>
<td>MODULE TYPE:</td>
<td>Whether a Program, Subroutine, or Function.</td>
</tr>
<tr>
<td>SOURCE FILE:</td>
<td>Name of Source File from file specification.</td>
</tr>
<tr>
<td>SOURCE FILE TYPE:</td>
<td>Source File Extension from file specification.</td>
</tr>
<tr>
<td>HOST:</td>
<td>Whether this is a host-dependent routine (VAX or IBM) or blank if host-independent.</td>
</tr>
<tr>
<td>SUBSYSTEM:</td>
<td>IISS sub-system this file resides in.</td>
</tr>
<tr>
<td>SUBDIRECTORY:</td>
<td>Sub-directory of that subsystem in which this file resides.</td>
</tr>
<tr>
<td>DOCUMENTATION GROUP:</td>
<td>Name of documentation group of which this source file is a member.</td>
</tr>
<tr>
<td>DESCRIPTION:</td>
<td>A description of the module as obtained from the source code.</td>
</tr>
</tbody>
</table>
ARGUMENTS: The arguments with which this routine is called if it is a Subroutine or a Function.

INCLUDE FILES: A list of all the files that are included into this module as well as their purposes.

ROUTINES CALLED: Subroutines or Functions, either documented or external, called by this module, if any.

CALLED DIRECTLY BY: The documented routines which call this module, if any.

USED IN MAIN PROGRAM(S): The documented Main Programs which contain this module in their parts list according to the list in section 3.10.7.

The Module Documentation is arranged alphabetically according to Module Name.
PRECOMPILER CONTROL Module Documentation

NAME: APNAME

PURPOSE: INTERFACES WITH THE MODULE NAME QUEUE SERVER

LANGUAGE: VAX-11 COBOL

MODULE TYPE: SUBROUTINE

SOURCE FILE: APNAME

SOURCE FILE TYPE: .COB

HOST: SUBSYSTEM: CDM

SUBDIRECTORY: DOCUMENTATION GROUP: PS41200

DESCRIPTION:

THE PURPOSE OF THIS ROUTINE IS TO ACT AS A GENERALIZED INTERFACE TO THE MODULE NAME QUEUE SERVER. IT WILL GET NEW NAMES. MOD 2.0 STANDARDIZED ERROR HANDLING.

ARGUMENTS:

-----------
DBMS-NAME = DSPLY [X(30)]
AP-NAME = DSPLY [X(10)]
RET-STATUS = DSPLY [X(5)]

INCLUDE FILES:

-----------
SRVRET - AS THE RETURN GIVEN A TABLE-FULL ERROR
ERRCDM - IISS ERROR STATUS CODES FOR CDMP MODULES
CHKCDM - IISS CDMP CHECK STATUS CODES
ERRPRO - PROCESS ERROR INCLUDE FILE

ROUTINES CALLED:

-----------
CDFUNC
MSEND

3-35
RCV
ERRPRO

CALLED DIRECTLY BY:
---------------------
CDP13 - CONTROLS REQUEST PROCESSOR CODE GENERATION

USED IN MAIN PROGRAM(S):
------------------------
CDP13 - CONTROLS REQUEST PROCESSOR CODE GENERATION
PRECOMPILER CONTROL Module Documentation

NAME: CDDGAP
PURPOSE: DELETE GENERATED AP ROWS IN THE GAP TABLES IN THE CDM
LANGUAGE: VAX-11 COBOL
MODULE TYPE: SUBROUTINE
SOURCE FILE: CDDGAP
SOURCE FILE TYPE: .COB
HOST:
SUBSYSTEM:
SUBDIRECTORY:
DOCUMENTATION GROUP: PS41200

DESCRIPTION:

PERFORM SQL DELETE STATEMENT TO DELETE GENERATED AP REFERENCES BASED ON THE NAME OF THE USER MODULE SUCCESSFULLY RE-PRECOMPILED

ARGUMENTS:

USER-MOD-ID = DSPLY [X(10)]
ORACLE-LDA = RECRD
RET-STATUS = DSPLY [X(5)]

INCLUDE FILES:

ERRCDM - IISS ERROR STATUS CODES FOR CDMP MODULES
CHKCDM - IISS CDMP CHECK STATUS CODES
ORCLEDA - WS DEFINITION FOR THE ORACLE LOGIN AREA
ERRPRO - PROCESS ERROR INCLUDE FILE

ROUTINES CALLED:

OOPEN
OSQL3
OBINDN
OELEC
OCLOSE
ERRPRO

CALLED DIRECTLY BY:

CDECHK - PROVIDE PRECOMPILER ERROR CHECKING

USED IN MAIN PROGRAM(S):

MAIN - PROGRAM NAME NDML MAIN AND UI
NAME: CDECHK
PURPOSE: PROVIDE PRECOMPILER ERROR CHECKING
LANGUAGE: VAX-11 COBOL
MODULE TYPE: SUBROUTINE
SOURCE FILE: CDECHK
SOURCE FILE TYPE: .COB
HOST: SUBSYSTEM: CDM
SUBDIRECTORY: DOCUMENTATION GROUP: PS41200

DESCRIPTION:

THIS ROUTINE WILL TEST THE RET-STATUS AT END OF
PRECOMPIILING ONE USER MODULE. IF GOOD THEN
RCMOD WILL BE CALLED TO MARK ALL SOFTWARE MODULES
PREVIOUSLY ASSOCIATED WITH THE USER ROUTINE AS
INACTIVE, THE DELETE ALL OLD GENERATED AP REFERENCES
AND FINALLY, INSERT ALL NEW GENERATED AP REFERENCES.
IF THE PRECOMPILE WAS UNSUCCESSFUL, THEN EACH
MODULE NEWLY ASSOCIATED WITH THE USER MODULE MUST BE
MARKED AS AVAILABLE FOR REUSE BY CALLING RUMOD AND
THE FILES CONTAINING GENERATED CODE DELETED.

ARGUMENTS:

PREC-STATUS = DSPLY [X(5)]
LAST-CGT-USED = DSPLY [S9(9)]
USER-MOD-ID = DSPLY [X(10)]
MY-HOST = DSPLY [XXX]
TARGET-HOST = DSPLY [XXX]
PARCL1 = DSPLY [X(30)]
PARCL2 = DSPLY [X(30)]
PARCL3 = DSPLY [X(30)]
PARCL4 = DSPLY [X(30)]
SOURCE-LANGUAGE = DSPLY [X(10)]
CODE-GENERATOR-TABLE = RECRD
ORACLE-LDA = RECRD
RET-STATUS = DSPLY [X(5)]
INCLUDE FILES:

ERRCDM - IISS ERROR STATUS CODES FOR CDMP MODULES
CHKCDM - IISS CDMP CHECK STATUS CODES
CGTABLE - CODE GENERATING TABLE- TRACKS ALL GENERATED SOFTWARE
ORCLEDA - WS DEFINITION FOR THE ORACLE LOGIN AREA
ERRPRO - PROCESS ERROR INCLUDE FILE

ROUTINES CALLED:

ERRPRO
RCMOD - MARK PREVIOUSLY ASSIGNED MODULES AS REUSABLE
CDDGAP - DELETE GENERATED AP ROWS IN THE GAP TABLES IN THE CDMP
CDIGAP - CDIGAP INSERTS A ROW IN THE GENERATED AP TABLE.
DELPIL
RUNMOD - SIGNAL REUSE OF A MODULE

CALLED DIRECTLY BY:

CDPRE - CDPRE MAIN ENTRY POINT FOR THE NDML PRECOMPILER

USED IN MAIN PROGRAM(S):

MAIN - PROGRAM NAME NDML MAIN AND UI
PRECOMPILER CONTROL Module Documentation

NAME: CDIGAP
PURPOSE: CDIGAP INSERTS A ROW IN THE GENERATED AP TABLE.

LANGUAGE: VAX-11 COBOL
MODULE TYPE: SUBROUTINE
SOURCE FILE: CDIGAP
SOURCE FILE TYPE: .COB
HOST: SUBSYSTEM: CDN
SUBDIRECTORY: DOCUMENTATION GROUP: PS41200

DESCRIPTION:

PERFORM SQL INSERT STATEMENT TO INSERT A SINGLE TUPLE INTO THE GENERATED AP TABLE.

ARGUMENTS:

GENERATED-MOD-ID = DSPLY [X(10)]
USER-MOD-ID = DSPLY [X(10)]
GENERATED-BY = DSPLY [X(10)]
DB-ID = DSPLY [S9(9)]
MOD-TYPE = DSPLY [X(10)]
CASE-NO = DSPLY [S9(9)]
IS-ACTION = DSPLY [X]
ORACLE-LDA = RECRD
RET-STATUS = DSPLY [X(5)]

INCLUDE FILES:

ERRCDM - I1SS ERROR STATUS CODES FOR CDMP MODULES
CHKCDM - I1SS CDMP CHECK STATUS CODES
ORACLELDA - WS DEFINITION FOR THE ORACLE LOGIN AREA
ERRPRO - PROCESS ERROR INCLUDE FILE
ROUTINES CALLED:

COPEN
OSQLS
OSBINDM
OEXEC
OCLOSE
ERRPRO

CALLED DIRECTLY BY:

CDECKX - PROVIDE PRECOMPILER ERROR CHECKING

USED IN MAIN PROGRAM(S):

MAIN - PROGRAM NAME NDML MAIN AND UI
PRECOMPILER CONTROL Module Documentation

NAME: CDM01
PURPOSE: CONTROLS ALL REQUESTS FOR MODULE NAMES
LANGUAGE: VAX-11 COBOL
MODULE TYPE: PROGRAM
SOURCE FILE: CDM01
SOURCE FILE TYPE: .COB
HOST: SUBSYSTEM: CDM
SUBDIRECTORY: DOCUMENTATION GROUP: PS41200

DESCRIPTION:

THIS ROUTINE IS A MAIN PROGRAM Q-SERVER.
IT WILL HANDLE 4 TYPES OF REQUESTS:

QO - PROVIDE A NEW UNUSED NAME FOR A SOFTWARE MODULE.
PD - PROVIDE A NAME FOR A SOFTWARE MODULE FROM A LIST
OF PREDETERMINED NAMES.
RM - MARK A SINGLE MODULE NAME AS AVAILABLE FOR REUSE
RA - MARK ALL NAMES ASSOCIATED WITH A USER MODULE NAME
(THROUGH PREVIOUSLY BEING GENERATED) AS BEING AVAILABLE
FOR REUSE.

NOTE LIMITATIONS SECTION!!

INCLUDE FILES:

CHKCDM - IISS CDMP CHECK STATUS CODES
ERRCDM - IISS ERROR STATUS CODES FOR CDMP MODULES
SRVRET - AS THE RETURN GIVEN A TABLE-FULL ERROR
ORCLEDA - WS DEFINITION FOR THE ORACLE LOGIN AREA
ALFABET - LETTERS CONTAINED IN THE ENGLISH ALPHABET
ERRPRO - PROCESS ERROR INCLUDE FILE

ROUTINES CALLED:

TRMNAT

3-45
INITIAL
OLON
OLOGOF
OOPEN
OCLOSE
OSQL3
ODFINN
RCV
OEXEC
OFETCH
OBINDN
OCOM
QSEND
ERRPRO
PRECOMPILER CONTROL Module Documentation

NAME: CDP13
PURPOSE: CONTROLS REQUEST PROCESSOR CODE GENERATION
LANGUAGE: VAX-11 COBOL
MODULE TYPE: SUBROUTINE
SOURCE FILE: CDP13
SOURCE FILE TYPE: .COB
HOST:
SUBSYSTEM: CDM
SUBDIRECTORY:
DOCUMENTATION GROUP: PS41200

DESCRIPTION:
---------
- CDP13 IS CALLED FOR EACH CONCEPTUAL TRANSACTION AFTER THE CS-IS TRANSFORM DONE BY CDPRE6 IS COMPLETE.
- IT PROCESSES THE SUBTRANSACTIONS IDENTIFIED BY THE CS TO IS DECOMPOSER, DETERMINING WHICH DBMS EACH SUBTRANS APPLIES TO, AND TAKING THE APPROPRIATE ACTION FOR EACH.

ARGUMENTS:
---------

- SUBTRANS-PROCESS-ID-TABLE = RECRD
- IS-ACTION-LIST = RECRD
- IS-QUALIFY-LIST = RECRD
- ES-ACTION-LIST = RECRD
- ES-QUALIFY-LIST = RECRD
- CS-ACTION-LIST = RECRD
- CE-WORK-LIST = RECRD
- UV-ABBR-LIST = RECRD
- CS-QUALIFY-LIST = RECRD
- JQG = RECRD
- JQG-ATTRIBUTE-PAIR-LIST = RECRD
- SET-TABLE = RECRD
- RFT = RECRD
- MY-HOST = DSPLY [XXX]
- TARGET-HOST = DSPLY [XXX]
- ORACLE-LDA = RECRD
- PARCL1 = DSPLY [X(30)]
- PARCL2 = DSPLY [X(30)]
PARCL3 = DSPLY [X(30)]
PARCL4 = DSPLY [X(30)]
ERRFILE = DSPLY [X(30)]
SOURCE-LANGUAGE = DSPLY [X(10)]
ISECTION-INDICATOR = DSPLY [9]
CODE-GENERATOR-TABLE = RECRD
RET-STATUS = DSPLY [X(5)]

INCLUDE FILES:

-----------

CHKCDM - IISS CDMP CHECK STATUS CODES
ERRCDM - IISS ERROR STATUS CODES FOR CDMP MODULES
APAT - ACCESS PATH TABLE
APINFO - ACCESS PATH INFORMATION TABLE
APRK - TABLE OF RECORD KEYS FOR CODASYL ACCESS PATHS
APGC - GENERIC CODASYL COMMAND TABLE
SUBPROC - SUBTRANSACTION PROCESSES ID TABLE
ISAL - INTERNAL SCHEMA ACTION LIST
ISQUAL - INTERNAL SCHEMA QUALIFY LIST
CSQUAL - CONCEPTUAL SCHEMA QUALIFY LIST
JQGTBL - JOIN QUERY GRAPH TELLS HOW TO CONNECT
       SUBTRANSACTIONS
APL - JOIN QUERY ATTRIBUTE PAIR LIST
SETTAB - LIST OF SETS OWNER-MEMBER RELATIONSHIPS
RFTABLE - THE RESULT FIELD TABLE
ESAL - EXTERNAL SCHEMA ACTION LIST
ESQUAL - EXTERNAL SCHEMA QUALIFY LIST
CEWORK - CS TO ES WORK LIST INFORMATION
UVABB - USER VIEW ABBREVIATION LIST
CSAL - CONCEPTUAL SCHEMA ACTION LIST
CGTABLE - CODE GENERATING TABLE - TRACKS ALL GENERATED
       SOFTWARE
ORCLEDA - WS DEFINITION FOR THE ORACLE LOGIN AREA
ERRPRO - PROCESS ERROR INCLUDE FILE

ROUTINES CALLED:

-----------

APNAME - INTERFACES WITH THE MODULE NAME QUEUE SERVER
CDPRES
CDP10
RPTERR - OUTPUT PRECOMPILER ERROR MESSAGES TO AP LISTING
CDQPO
CDQPC
CDQPT
CDPRES7
PRECOMPILED CONTROL Module Documentation

NAME: CDPRE
PURPOSE: CDPRE MAIN ENTRY POINT FOR THE NDML PRECOMPLIER
LANGUAGE: VAX-11 COBOL
MODULE TYPE: SUBROUTINE
SOURCE FILE: CDPRE
SOURCE FILE TYPE: .COB
HOST: SUBSYSTEM: CDM
SUBDIRECTORY: DOCUMENTATION GROUP: PS41200

DESCRIPTION:
- This is the main entry point for the NDML precompiler on input the user interface has been performed. It calls CDPRE1 to break apart the user's software module into the four parcels, then calls

ARGUMENTS:
- AP-FILE-IN = DSPLY [X(30)]
ERROR-FILE = DSPLY [X(30)]
AP-TARGET-HOST = DSPLY [XXX]
USER-AP-NAME = DSPLY [X(10)]
CODE-GENERATOR-TABLE = RECRD
GOOD-PRECOMPILES = DSPLY [S9(9)]
BAD-PRECOMPILES = DSPLY [S9(9)]
RET-STATUS = DSPLY [X(5)]

INCLUDE FILES:
- ORCLEDA - WS DEFINITION FOR THE ORACLE LOGIN AREA
SRVRET - AS THE RETURN GIVEN A TABLE-FULL ERROR
CHKCDM - IISS CDMP CHECK STATUS CODES
ERRCDM - IISS ERROR STATUS CODES FOR CDMP MODULES
CGTABLE - CODE GENERATING TABLE- TRACKS ALL GENERATED SOFTWARE
ERRPRO - PROCESS ERROR INCLUDE FILE
ROUTINES CALLED:

OLON
OPNINPT
RPTERR - OUTPUT PRECOMPILER ERROR MESSAGES TO AP LISTING
CDPRE1
CDPRE2
CDP12
CDP14
OCOM
OLOGOF
ERRFRO
OROL
CDECHK - PROVIDE PRECOMPILER ERROR CHECKING
OPNERR
WRITERR
REDINPT
UNPLINE
CLSERR

CALLED DIRECTLY BY:

MAIN - PROGRAM NAME NDML MAIN AND UI

USED IN MAIN PROGRAM(S):

MAIN - PROGRAM NAME NDML MAIN AND UI
PRECOMPILER CONTROL Module Documentation

NAME: MAIN
PURPOSE: PROGRAM NAME NDML MAIN AND UI
LANGUAGE: VAX-11 COBOL
MODULE TYPE: PROGRAM
SOURCE FILE: MAIN

DESCRIPTION:

INCLUDE FILES:

FILSTAT - VARIABLE DEFINITION FOR FILE STATUS
ERRCDM - IISS ERROR STATUS CODES FOR CDMP MODULES
CHKCDM - IISS CDMP CHECK STATUS CODES
SRVRET - AS THE RETURN GIVEN A TABLE-FULL ERROR
CGTABLE - CODE GENERATING TABLE- TRACKS ALL GENERATED SOFTWARE
ERRPRO - PROCESS ERROR INCLUDE FILE

ROUTINES CALLED:

CDPRE - CDPRE MAIN ENTRY POINT FOR THE NDML PRECOMPILER
TRMNFAT
ERRPRO
INITEX
PRECOMPILER CONTROL Module Documentation

NAME: OPNFIL
PURPOSE: THIS ROUTINE OPENS AN OUTPUT FILE.
LANGUAGE: C
MODULE TYPE: FUNCTION
FUNCTION TYPE: INT ()
SOURCE FILE: OPNFIL
SOURCE FILE TYPE: .C
HOST: SUBSYSTEM: CDM
SUBDIRECTORY: DOCUMENTATION GROUP: PS41200

DESCRIPTION:

--------
SYNOPSIS

C -- OPNFIL(&FILE_NAME);

COBOL -- CALL "OPNFIL" USING FILE-NAME.

FORTRAN -- CALL OPNFIL(FILENAME)

INPUT:
CHAR *FILE_NAME;

OUTPUT:

DESCRIPTION:
THE FILE WILL CONTAINS THE USER'S NDDL.

ARGUMENTS:
--------
FILE_NAME = CHAR *

INCLUDE FILES:
-----------
STDIO - **** PURPOSE NOT FOUND BY STRIPPER ****

ROUTINES CALLED:

3-51
FOPEN
PRINTF
NAME: RCMOD
PURPOSE: MARK PREVIOUSLY ASSIGNED MODULES AS REUSABLE
LANGUAGE: VAX-11 COBOL
MODULE TYPE: SUBROUTINE
SOURCE FILE: RCMOD
SOURCE FILE TYPE: .COB
HOST: SUBSYSTEM: CDM
SUBDIRECTORY: DOCUMENTATION GROUP: PS41200

DESCRIPTION:

-------------
THIS ROUTINE MUST BE USED TO MARK ALL PREVIOUSLY ASSIGNED MODULES GENERATED FOR THE USER MODULE NAME AS REUSEABLE. IT EXPECTS THE NAME OF A USER MODULE.

ARGUMENTS:

-------------
USER-MOD-NAME = DSPLY [X(10)]
RET-STATUS = DSPLY [X(5)]

INCLUDE FILES:

-------------
SRVRET - AS THE RETURN GIVEN A TABLE-FULL ERROR
ERRCDM - IISS ERROR STATUS CODES FOR CDMP MODULES
CHKCDM - IISS CDMP CHECK STATUS CODES
ERRPRO - PROCESS ERROR INCLUDE FILE

ROUTINES CALLED:

-------------
CDFUNC
MSEND
RCV
ERRPRO

CALLED DIRECTLY BY:

-------------
3-53
CDECHK - PROVIDE PRECOMPILED ERROR CHECKING

USED IN MAIN PROGRAM(S):

<table>
<thead>
<tr>
<th>PROGRAM NAME</th>
<th>NDML MAIN AND UI</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAIN</td>
<td></td>
</tr>
</tbody>
</table>
PRECOMPILER CONTROL Module Documentation

NAME: RPTERR
PURPOSE: OUTPUT PRECOMPILER ERROR MESSAGES TO AP LISTING
LANGUAGE: VAX-11 COBOL
MODULE TYPE: SUBROUTINE
SOURCE FILE: RPTERR
SOURCE FILE TYPE: .COB
HOST:
SUBSYSTEM: CDM
SUBDIRECTORY:
DOCUMENTATION GROUP: PS41200

DESCRIPTION:

THIS PROGRAM OUTPUTS ERROR MESSAGES TO AP LISTING FROM PRECOMPILER-ENCOUNTERED ERRORS. THIS ROUTINE SIMPLY OPENS THE LISTING AT END, WRITES THE MESSAGE AND CLOSES THE LISTING.

ARGUMENTS:

---------------
FNAME = DSPLY [X(30)]
ERRMESS = DSPLY [X(60)]

INCLUDE FILES:

---------------
FILSTAT - VARIABLE DEFINITION FOR FILE STATUS
ERRPRO - PROCESS ERROR INCLUDE FILE

ROUTINES CALLED:

---------------
ERRPRO

CALLED DIRECTLY BY:

---------------
CDP13 - CONTROLS REQUEST PROCESSOR CODE GENERATION
CDPRE  -  CDPRE  MAIN ENTRY POINT FOR THE NDML PRECOMPILER

USED IN MAIN PROGRAM(S):

CDP13  -  CONTROLS REQUEST PROCESSOR CODE GENERATION
MAIN    -  PROGRAM NAME    NDML MAIN AND UI
PRECOMPILER CONTROL Module Documentation

NAME: RUNMOD
PURPOSE: SIGNAL REUSE OF A MODULE
LANGUAGE: VAX-11 COBOL
MODULE TYPE: SUBROUTINE
SOURCE FILE: RUNMOD
SOURCE FILE TYPE: .COB
HOST:
SUBSYSTEM: CDN
SUBDIRECTORY:
DOCUMENTATION GROUP: PS41200

DESCRIPTION:

THIS ROUTINE MUST BE USED TO MARK A SINGLE MODULE NAME AS AVAILABLE FOR REUSE. IT WILL SEND A MESSAGE TO THE MODULE NAME Q-SERVER.

ARGUMENTS:

DEMS-NAME = DSPLY [X(10)]
AP-NAME = DSPLY [X(10)]
RET-STATUS = DSPLY [X(9)]

INCLUDE FILES:

SRVRET - AS THE RETURN GIVEN A TABLE-FULL ERROR
ERBCOM - IIISS ERROR STATUS CODES FOR CDNP MODULES
CMECOM - IIISS CDNP CHECK STATUS CODES
ERRPRO - PROCESS ERROR INCLUDE FILE

ROUTINES CALLED:

CDPUNC
RSEND
ERRPRO

CALLED DIRECTLY BY:

CDECKX - PROVIDE PRECOMPILER ERROR CHECKING
USED IN MAIN PROGRAM(S):

```
MAIN    - PROGRAM NAME    NDML MAIN AND UI
```
PRECOMPILER CONTROL Module Documentation

NAME: STRMOV
PURPOSE: MOVE THE STRING TO THE POOL
LANGUAGE: VAX-11 FORTRAN
MODULE TYPE: SUBROUTINE
SOURCE FILE: STRMOV
SOURCE FILE TYPE: .FOR
HOST:
SUBSYSTEM: CDN
SUBDIRECTORY:
DOCUMENTATION GROUP: PS41200

DESCRIPTION:

ARGUMENTS:

--------------
STRING = CHAR
POOL = CHAR
SIZE = I*4
BCHAR = I*4

--------------
PRECOMPILER CONTROL Module Documentation

NAME: SUBMOV
PURPOSE: FACILITATE A SUB-STRING MOVE
LANGUAGE: VAX-11 FORTRAN
MODULE TYPE: SUBROUTINE
SOURCE FILE: SUBMOV
SOURCE FILE TYPE: .FOR
HOST: SUBSYSTEM: CDN
SUBDIRECTORY: DOCUMENTATION GROUP: PS41200

DESCRIPTION:

ARGUMENTS:

CLAUS - CHAR
SUBSTR - CHAR
ECHAR = I*4
ECHAR = I*4
3.10.9 Include File Descriptions

The following list contains a purpose and description of each include file listed in 3.10.4 as specified in the source code. The language it is written in is also given.
PRECOMPILER CONTROL Include File Description

FILE NAME: ALPHABET
PURPOSE: LETTERS CONTAINED IN THE ENGLISH ALPHABET
LANGUAGE: VAX-11 COBOL

DESCRIPTION:

THIS IS THE ENGLISH ALPHABET. THE LETTERS ARE USED FOR ASSIGNING THE NEXT UNIQUE NAME WHEN THE NUMBERS RUN OUT.

ALPHABET. INC
PRECOMPILER CONTROL Include File Description

FILE NAME: APAT
PURPOSE: ACCESS PATH TABLE
LANGUAGE: VAX-11 COBOL

DESCRIPTION:

CONTAINS THE ACCESS PATH FOR ONE SUBTRANSACTION
FOR A MDML REQUEST.
PRECOMPILER CONTROL Include File Description

FILE NAME: APGC
PURPOSE: GENERIC CODASYL COMMAND TABLE
LANGUAGE: VAX-11 COBOL

DESCRIPTION:

----------------

HOLDS THE GENERIC CODASYL DML COMMANDS FOR AN
ACCESS PATH OF A NDML REQUEST
PRECOMPILER CONTROL Include File Description

FILE NAME: APINFO
PURPOSE: ACCESS PATH INFORMATION TABLE
LANGUAGE: VAX-11 COBOL

DESCRIPTION:
--------------

THIS IS A COLLECTION OF INFORMATION STORED IN A
NUMBER OF VARIOUS TABLES USED BY THE ACCESS PATH TABLE
AND THE GENERIC CODASYL TABLE. SEE CDMP SPEC. PRE6

APINFO.INC
PRECOMPILED CONTROL Include File Description

FILE NAME: APL
PURPOSE: JOIN QUERY ATTRIBUTE PAIR LIST
LANGUAGE: VAX-11 COBOL

DESCRIPTION:

------------

CONTAINS INFORMATION ABOUT THE JOIN ATTRIBUTES FOR NDML SUBTRANSACTIONS
PRECOMPILER CONTROL Include File Description

FILE NAME: APRK
PURPOSE: TABLE OF RECORD KEYS FOR CODASYL ACCESS PATHS
LANGUAGE: VAX-11 COBOL

DESCRIPTION:
-------------

CONTAINS INFORMATION FOR THE KEYS OF
RECORDS CONTAINED IN THE CURRENT ACCESS
PATH
PRECOMPILER CONTROL Include File Description

FILE NAME: CEWORK
PURPOSE: CS TO ES WORK LIST INFORMATION
LANGUAGE: VAX-11 COBOL

DESCRIPTION:

-----------

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PRESCOMPILED CONTROL Include File Description

FILE NAME  OOTABLE
PURPOSE  CODE GENERATING TABLE- TRACKS ALL GENERATED SOFTWARE
LANGUAGE  VIA IV COBOL

DESCRIPTION

CODE GENERATOR TABLE HOLDS PERTINENT RESULTS ABOUT ALL CODE GENERATED OR MODIFIED BY THE
PRESCOMPILED
NOTE HOW YOU RESERVE FOR SWAPPING DURING SORTING.
PRECOMPILER CONTROL Include File Description

FILE NAME: CHKCDM
PURPOSE: IISS CDMP CHECK STATUS CODES
LANGUAGE: VAX-11 COBOL

DESCRIPTION:

CONTAINS ALL STATUS CODES FOR THE CDMP MODULES
PRECOMPILER CONTROL Include File Description

FILE NAME: CSAL
PURPOSE: CONCEPTUAL SCHEMA ACTION LIST
LANGUAGE: VAX-11 COBOL

DESCRIPTION:

---------------
TABLE TO HOLD CONCEPTUAL DATA ABOUT THE REQUEST

***** THE CONCEPTUAL SCHEMA ACTION LIST
PRECOMPILER CONTROL Include File Description

FILE NAME: CSQUAL
PURPOSE: CONCEPTUAL SCHEMA QUALIFY LIST
LANGUAGE: VAX-11 COBOL

DESCRIPTION:

CONTAINS CONCEPTUAL SCHEMA INFORMATION FOR THE REQUESTS QUALIFICATION

THE CONCEPTUAL SCHEMA QUALIFY LIST
PRECOMPILED CONTROL Include File Description

FILE NAME: ERRCDM
PURPOSE: I115 ERROR STATUS CODES FOR CDMP MODULES
LANGUAGE: VAX-11 COBOL

DESCRIPTION:

CONTAINS ALL ERROR CODES USED BY CDMP MODULES FOR ERROR HANDLING
PRECOMPILER CONTROL Include File Description

FILE NAME: ERRPRO
PURPOSE: PROCESS ERROR INCLUDE FILE
LANGUAGE: VAX-11 COBOL

DESCRIPTION:  

------------------
PREPROCESSOR CONTROL Include File Description

FILE NAME: ESAL
PURPOSE: EXTERNAL SCHEMA ACTION LIST
LANGUAGE: VAX-11 COBOL

DESCRIPTION:

CONTAINS THE EXTERNAL SCHEMA INFORMATION FOR AN
NDML REQUEST

THE EXTERNAL SCHEMA ACTION LIST
FILE NAME: ESQUAL
PURPOSE: EXTERNAL SCHEMA QUALIFY LIST
LANGUAGE: VAX-11 COBOL

DESCRIPTION:

CONTAINS EXTERNAL SCHEMA INFORMATION FOR THE NDML QUALIFICATION

THE EXTERNAL SCHEMA QUALIFY LIST
FILE NAME: FILSTAT
PURPOSE: VARIABLE DEFINITION FOR FILE STATUS
LANGUAGE: VAX-11 COBOL

DESCRIPTION:

FILE USAGE FILE STATUS PARAMETER

FILSTAT
FILE USAGE FILE STATUS PARAMETER
SIZE AND THE 88 VALUE ARE PROBABLY MACHINE DEPENDENT
(THIS IS FOR VAX-11 COBOL)
PRECOMPILER CONTROL Include File Description

FILE NAME: ISAL
PURPOSE: INTERNAL SCHEMA ACTION LIST
LANGUAGE: VAX-11 COBOL

DESCRIPTION:
-------
CONTAINS INTERNAL SCHEMA INFORMATION ABOUT AN NDML REQUEST

THE INTERNAL SCHEMA ACTION LIST
PRECOMPILER CONTROL Include File Description

FILE NAME: ISQUAL
PURPOSE: INTERNAL SCHEMA QUALIFY LIST
LANGUAGE: VAX-11 COBOL

DESCRIPTION:

CONTAINS INTERNAL SCHEMA INFORMATION FOR AN NDML QUALIFICATION

THE INTERNAL SCHEMA QUALIFY LIST
PRECOMPILER CONTROL Include File Description

FILE NAME: JQGTUL
PURPOSE: JOIN QUERY GRAPH TELLS HOW TO CONNECT SUBTRANSACTIONS
LANGUAGE: VAX-11 COBOL

DESCRIPTION:
----------
PRECOMPILER CONTROL Include File Description

FILE NAME: ORCLED
PURPOSE: VS DEFINITION FOR THE ORACLE LOGIN AREA
LANGUAGE: VAX-11 COBOL

DESCRIPTION:

---------

THE ORACLE LOGON DATA AREA

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PRERECOMPILER CONTROL Include File Description

FILE NAME: RFTABLE
PURPOSE: THE RESULT FIELD TABLE
LANGUAGE: VAX-11 COBOL

DESCRIPTION:

CONTAINS CONCEPTUAL SCHEMA INFORMATION ABOUT THE RESULTS OF AN NDML REQUEST

THE RESULT FIELD TABLE

WHEN CHANGING THE STRUCTURE OF THIS TABLE BE SURE TO CHANGE THE LAYOUT IN THE
PRECOMPILED CONTROL Include File Description

FILE NAME: SETTAB
PURPOSE: LIST OF SETS OWNER-MEMBER RELATIONSHIPS
LANGUAGE: VAX-11 COBOL

DESCRIPTION:

SET TABLE TO KEEP TRACK OF CODASYL NDML REQUESTS
IN TERMS OF OWNER AND MEMBER RELATIONSHIPS
PRECOMPILER CONTROL Include File Description

FILE NAME: SRVRET
PURPOSE: AS THE RETURN GIVEN A TABLE-FULL ERROR
LANGUAGE: VAX-11 COBOL

DESCRIPTION:

 MODIFIED 11/2/83 TO INCLUDE RET-CODE-5
 MODIFIED 1/9/84 TO INCREASE ALL ERROR CODES TO PIC X(5)
 AND TO ELIMINATE ALPHA'S
 MODIFIED 1/26/84 TO ADD RET-CODE FOR GETUSR-NOT-SUCC
 SRV-SUCCESSFUL ADDED FOR GENERIC RETURN
 MODIFIED 2/7/84 TO ADD ERROR CODES FOR ENTRY-NOT-FOUND
 MODIFIED 2/8/84 TO ADD WHIST-NOT-SUCCESSFUL
 MODIFIED 2/20/84 TO ADD TSTMOD NEW CODES.
 MODIFIED 20 AUG 84 INITIALIZE ALL LOCAL VARIABLES TO
 SPACES OR 0.
 MODIFIED 5/21/85 TO ADD RCL AND FILGEN RETURN CODES
PRECOMPIILER CONTROL Include File Description

FILE NAME: SUBPROC
PURPOSE: SUBTRANSACTION PROCESSES ID TABLE
LANGUAGE: VAX-11 COBOL

DESCRIPTION:

---------------

THIS TABLE MUST HAVE THE SAME NUMBER OF OCCURS AS THE RITABLE.INC SINCE THEY ARE PARALLEL TABLES.

3-85
PRECOMPILER CONTROL Include File Description

FILE NAME: UVABBR
PURPOSE: USER VIEW ABBREVIATION LIST
LANGUAGE: VAX-11 COBOL

DESCRIPTION:

CONTAINS THE ABBREVIATIONS FOR ALL USER VIEW REFERENCED IN THE NDML REQUEST
3.10.10 Hierarchy Chart

The following hierarchy charts show the relationships between all of the modules mentioned in the above documentation. A module may call a subroutine several times within its code, but the call will only be shown once as a single relationship on this hierarchy chart. All modules shown at the top of the first page are considered Main Programs as described in section 3.10.1 above.

There is an internal paging scheme as marked by the numbers in the upper right corner of each page. An index after the last page of the chart shows where a routine and its calls are first defined. If a routine has no page reference, it either makes no calls or is an external routine. A continuation box on the end of a tree limb shows where that the tree continues on the page numbered mentioned. A number in a box with a routine name points to the page where the routine is further defined within the hierarchy tree. If there is no number in a box, the routine either makes no calls or is an external routine.
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+(CONT) | WRTERR | REDINPT | UNPLINE | CLSERR
+-+++++++ | ++++++++ | ++++++++ | ++++++++ | ++++++++ |
APNAME.....6    RUMOD.....16
CDDGAP.....14  TRMNAT
CDECHK.....10  UNPLINE
CDFUNC     WRITERR
CDIGAP.....15
CDNO1......2
CDP10
CDP12
CDP15.....3
CDP14
CDPRE.....4
CDPRE1
CDPRE2
CDPRE7
CDPRE8
CDPRE9
CDQPC
CDQPO
CDQPT
CLSERR
DELFIL
ERRPRO
FOPEN
INITIAL
INITEI
MAIN.......4
MSEND
OBINDN
CCLOSE
OCOM
ODFIMM
OEXEC
OFETCH
OLOGOF
OLON
OOPEN
OPNERR
OPNFLIL....1
OPMINPT
OROL
OSQL3
PRINTF
QSEND
RQMD1.....13
RCV
REDINPT
RPTERR.....3
3.11 Program Listings Comments

This information is contained in the Module Descriptions in section 3.10.
SECTION 4
QUALITY ASSURANCE PROVISIONS

4.1 Introduction and Definitions

"Testing" is a systematic process that may be preplanned and explicitly stated. Test techniques and procedures may be defined in advance, and a sequence of test steps may be specified. "Debugging" is the process of isolation and correction of the cause of an error.

"Antibugging" is defined as the philosophy of writing programs in such a way as to make bugs less likely to occur and when they do occur, to make them more noticeable to the programmer and the user. In other words, as much error checking as is practical and possible in each routine should be performed.

4.2 Computer Programming Test and Evaluation

The quality assurance provisions for test consists of the normal testing techniques that are accomplished during the construction process. They consist of design and code walk-throughs, unit testing, and integration testing. These tests are performed by the design team. Structured design, design walk-through and the incorporation of "antibugging" facilitate this testing by exposing and addressing problem areas before they become coded "bugs."
END 7-87 DTC