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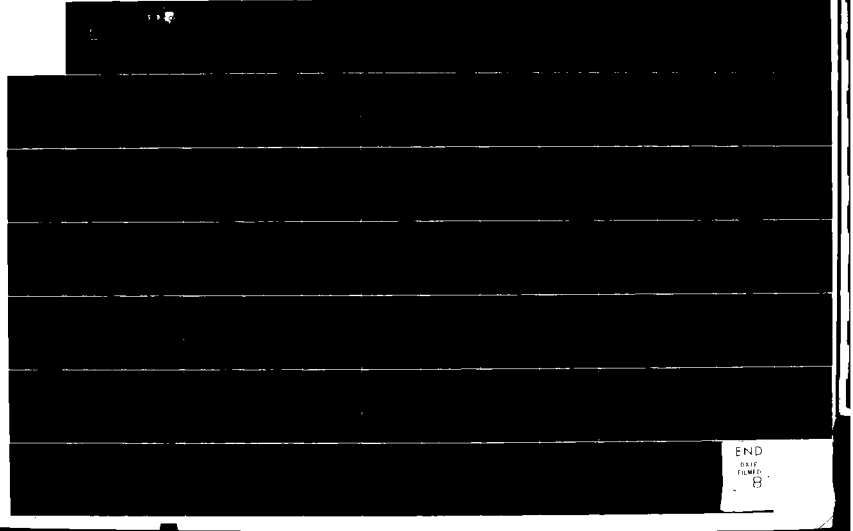

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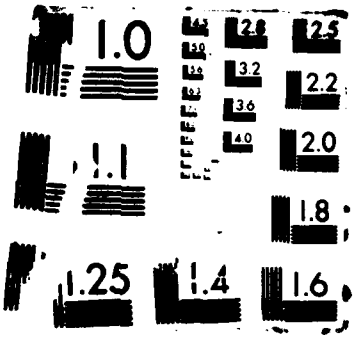
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AFWAL-TR-86-4006
Volume V
Part 24

INTEGRATED INFORMATION SUPPORT SYSTEM (IISS)
Volume V - Common Data Model Subsystem
Part 24 - NDML Precompiler Generator Support Routines Product Specification

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

Final Report for Period 22 September 1980 - 31 July 1985

November 1985

PREPARED FOR:

MATERIALS LABORATORY
AIR FORCE WRIGHT AERONAUTICAL LABORATORIES
AIR FORCE SYSTEMS COMMAND
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The computer software contained herein are theoretical and/or references that in no way reflect Air Force-owned or -developed computer software.

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18 SUBJECT TERMS (Continue on reverse if necessary and identify by block number)

19 ABSTRACT (Continue on reverse if necessary and identify by block number)

This document is the product specification establishing the design implementation of the IISS Configuration Item PRE9.1 which is a collection of support routines used during generation of request processors.

See p 1-1

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Vol V - Common Data Model Subsystem
Part 24 - NDML Precompiler Generator Support Routines
Product Specification

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

Subcontractors	Role
Boeing Military Aircraft Company (BMAC)	Reviewer.
D. Appleton Company (DACOM)	Responsible for IDEF support, state-of-the-art literature search.
General Dynamics/ Ft. Worth	Responsible for factory view function and information models.

Subcontractors	Role
Illinois Institute of Technology	Responsible for factory view function research (IITRI) and information models of small and medium-size business.
North American Rockwell	Reviewer.
Northrop Corporation	Responsible for factory view function and information models.
Pritsker and Associates	Responsible for IDEF2 support.
SofTech	Responsible for IDEF0 support.

TASKS 4.3 - 4.9 (TEST BED)

Subcontractors	Role
Boeing Military Aircraft Company (BMAC)	Responsible for consultation on applications of the technology and on IBM computer technology.
Computer Technology Associates (CTA)	Assisted in the areas of communications systems, system design and integration methodology, and design of the Network Transaction Manager.
Control Data Corporation (CDC)	Responsible for the Common Data Model (CDM) implementation and part of the CDM design (shared with DACOM).
D. Appleton Company (DACOM)	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.

Subcontractors	Role
Digital Equipment Corporation (DEC)	Consulting and support of the performance testing and on DEC software and computer systems operation.
McDonnell Douglas Automation Company (McAuto)	Responsible for the support and enhancements to the Network Transaction Manager Subsystem during 1984/1985 period.
On-Line Software International (OSI)	Responsible for programming the Communications Subsystem on the IBM and for consulting on the IBM.
Rath and Strong Systems Products (RSSP) (In 1985 became McCormack & Dodge)	Responsible for assistance in the implementation and use of the MRP II package (PIOS) that they supplied.
SofTech, Inc.	Responsible for the design and implementation of the Network Transaction Manager (NTM) in 1981/1984 period.
Software Performance Engineering (SPE)	Responsible for directing the work on performance evaluation and analysis.
Structural Dynamics Research Corporation (SDRC)	Responsible for the User Interface and Virtual Terminal Interface Subsystems.

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

Contractors	ICAM Project	Contributing Activities
Boeing Military Aircraft Company (BMAC)	1701, 2201, 2202	Enhancements for IBM node use. Technology Transfer to Integrated Sheet Metal Center (ISMC).

Contractors	ICAM Project	Contributing Activities
Control Data Corporation (CDC)	1502, 1701	IISS enhancements to Common Data Model Processor (CDMP).
D. Appleton Company (DACOM)	1502	IISS enhancements to Integration Methodology.
General Electric	1502	Operation of the Test Bed and communications equipment.
Hughes Aircraft Company (HAC)	1701	Test Bed enhancements.
Structural Dynamics Research Corporation (SDRC)	1502, 1701, 1703	IISS enhancements to User Interface/Virtual Terminal Interface (UI/VTI).
Systran	1502	Test Bed enhancements. Operation of Test Bed.

TABLE OF CONTENTS

SECTION 1

SCOPE

1.1 Identification

This specification establishes the design of Function PRE9.1, "Request Processor Generator Support Routines", one of the major functions of the Configuration Item (CI) "Precompiler" to be built and formally accepted by the ICAM Program Office. This CI constitutes one of the subsystems of the Common Data Model Processor (CDMP).

1.2 Functional Summary

The purpose of this Computer Program Configuration Item (CPCI) is to provide code generation support functions to the CDMP Request Processor generators.

The following functions will be performed by this CPCI:

1. Generate working storage and procedure division code for the conceptual schema to internal schema transformation of runtime search parameters and update values (CDCI).

2. Combine two work files into one file containing the Request Processor program (CDCWF).

3. Generate working storage and procedure division code for the internal schema to conceptual schema transformation of retrieved data fields (CDIC).

4. Generate macro code with the proper substitution parameters (CDMACR).

5. Generate conceptual schema data definitions for runtime search parameters and update values (CDMSG).

6. Generate internal schema data definitions for runtime search parameters (CDPRM).

7. Generate internal schema data definitions for qualified data fields (CDQDF).

8. Generate internal schema data definitions for retrieved

data fields (CDRDF).

9. Generate conceptual schema data definitions for retrieved data fields (CDRFT).

SECTION 2

DOCUMENTS

2.1 Reference Documents

1. ICAM Documentation Standards: IDS15012000A, 28 December 1981.

2. D. Appleton Co., CDM Administrators Manual: UM620141000, March 1984.

3. D. Appleton Co., CDM1-IDEF, Model of the Common Data Model: CCS620141000, 15 May 1985.

4. D. Appleton Co., Computer Program Development Specification (DS) for ICAM Integrated Support System (IISS) Configuration Item: NDML Precompiler: DS620141200, October 1984.

5. D. Appleton Co., Embedded NDML Programmer's Reference Manual: PRM620141200, March 1985.

6. Softech, Inc., NTM Programmer's Guide: UM620140001, July 1984.

7. Control Data Corporation, Computer Program Development Specification (DS) for ICAM Integrated Support System (IISS) Configuration Item: NDDL Command Processor; DS620141100, June 1985.

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 NDML programmer references

data.

Database Management System: (DBMS)

Distributed Request Supervisor: (DRS) This IISS CDM subsystem configuration item controls the execution of distributed NDML 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

The graphic portrayal of this CPCI is included in Section 3.10. This chart shows the hierarchical relationship of each module making up this CPCI.

Each code generation support function is contained in a single COBOL module identified in Section 1.2 of this document. A separate module CDPIC is used by some of the support functions to generate a COBOL picture clause for program variables.

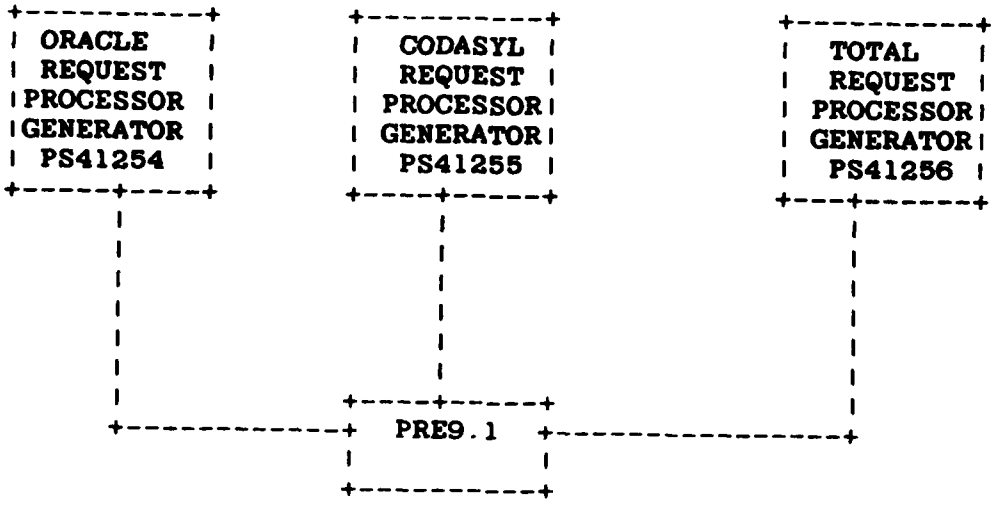
3.2 Functional Flow

This CPCI implemented the logic defined in the Development Specification for this CPCI. Details of inputs/outputs and relationships between modules are found in Section 3.10.

This CPCI has been designated to operate in a batch or interactive mode. It must operate in the system environment established for IISS; that is, the Network Transaction Manager. It currently can only be executed on the DEC VAX due to the dependence on the VAX sort although this can be changed for execution on the IBM.

3.3 Interfaces

The following diagram depicts the interface of PRE9.1 with other CPCI's in the system.


ORACLE REQUEST PROCESSOR GENERATOR PS41254
CODASYL REQUEST PROCESSOR GENERATOR PS41255
TOTAL REQUEST PROCESSOR GENERATOR PS41256
PRE9.1

3.3.1 Inputs/Outputs

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

MODULE: CDCI

INPUT	OUTPUT
Work File Name	
Procedure Division File Name	
ORACLE Logon Data Area	
Next Parameter Number	
Table Index	
Data Base Identification Number	
Data Field Name	
Record Name	
Tag Identification Number	
Transaction Type	

MODULE: CDCWF

INPUT	OUTPUT
Work File name	
Procedure Division File Name	
Current Host	

MODULE: CDIC

INPUT	OUTPUT
Work File Name	
Procedure Division File Name	
ORACLE Logon Data Area	
Next Parameter Number	
Internal Schema Action	
List Index	
Database Identification Number	
Data Field Name	
Record Name	
Tag Identification Number	

MODULE: CDMACR

INPUT	OUTPUT
File Name	
ORACLE Logon Data Area	
Library Name	
Macro Name	
Parameter Substitution List	

MODULE: CDMSG

INPUT	OUTPUT
Work File Name	
Current Subtransaction Identification	
Conceptual Schema Qualify List	
Internal Schema Qualify List	
Internal Schema Action List	
Conceptual Schema Action List	

MODULE: CDPRN

INPUT	OUTPUT
Work File Name	
Current Subtransaction Identification	
Internal Schema Qualify List	

MODULE: CDQDF

INPUT	OUTPUT
Work File Name	
Current Subtransaction Identification	
Internal Schema Qualify List	

MODULE: CDRDF

INPUT	OUTPUT
Work File Name Current Subtransaction Identification Internal Schema Action List	

MODULE: CDRFT

INPUT	OUTPUT
Workfile Name Current Subtransaction Identification Result Field table	

3.4 Program Interrupts

Not applicable to the CPCI.

3.5 Timing and Sequencing Description

This CPCI is called upon by each Request Processor generator.

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. The model is defined by the CDM1 and the IDEF-1 model of the CDM, Reference Number 3.

3.7.1.1 File Description

No permanent files have been defined for this CPCI. It uses temporary scratch files for the generated program source code.

3.7.1.2 Table Description

All tables used by this CPCI have been defined by the Development Specification for 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 team using defined IISS Software Configuration Management procedures. This CPCI will use the COBOL and FORTRAN language compilers.

3.9 Adaptation Data

This CPCI has been coded using ANSI COBOL language. The intent was to provide a transportable system. Any system environment supporting these languages, a virtual memory management schema, the COMM and NTM subsystems 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.

GENERATOR SUPPORT ROUTINES Main Program List

Module Name	Purpose
CDCI	GENERATES WS AND PROC DIV CODE FOR CS TO IS
CDCWF	COMBINES WORKFILES FOR QP INTO ONE FILE
CDIC	GENERATES WS AND PROC DIV CODE FOR DF FRO IS TO CS
CDIMD	RETRIEVES INTERNAL SCHEMA METADATA
CDMACR	GENERATE MACRO CODE INTO THE NAMED FILE
CDMSG	GENERATE WS CS DATA DEFINITIONS FOR RUNTIME PARAMETERS
CDPRM	GENERATE WS IS DATA DEFINTIONS FOR SEARCH PARAMETERS
CDQDF	GENERATED WS IS DATA DEFINTIONS FOR RETRIEVAL QUAL.
CDQPOP	CONVERT NDML OPERATOR INTO COBOL OPERATOR
CDRDF	GENERATE WS IS DATA DEFINITIONS FOR RETRIEVED DF'S
CDRFT	GENERATE CS DATA DEFINITION FOR RETRIEVED DF'S

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.

GENERATOR SUPPORT ROUTINES Module List

Module Name	Purpose
CDCI	GENERATES WS AND PROC DIV CODE FOR CS TO IS
CDCWF	COMBINES WORKFILES FOR QP INTO ONE FILE
CDIC	GENERATES WS AND PROC DIV CODE FOR DF FRO IS TO CS
CDIMD	RETRIEVES INTERNAL SCHEMA METADATA
CDMACR	GENERATE MACRO CODE INTO THE NAMED FILE
CDMSG	GENERATE WS CS DATA DEFINITIONS FOR RUNTIME PARAMETERS
CDPIC	GENERATE A PICTURE CLAUSE DATA DEFINITION FOR COBOL IDENTIFIER
CDPRM	GENERATE WS IS DATA DEFINTIONS FOR SEARCH PARAMETERS
CDQDF	GENERATED WS IS DATA DEFINTIONS FOR RETRIEVAL QUAL.
CDQPOP	CONVERT NDML OPERATOR INTO COBOL OPERATOR
CDRDF	GENERATE WS IS DATA DEFINITIONS FOR RETRIEVED DF'S
CDRFT	GENERATE CS DATA DEFINITION FOR RETRIEVED DF'S

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.

GENERATOR SUPPORT ROUTINES External Routines List

Module Name	First User
DELFIL	CDCWF
ERRPRO	CDCI
OBINDN	CDIC
OCLOSE	CDIC
ODFINN	CDCI
OEXEC	CDIC
OFETCH	CDIMD
OOPEN	CDIC
OSQL3	CDIMD

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.

GENERATOR SUPPORT ROUTINES Include File List

File Name	Purpose
COBOLOP	WORKING STORAGE VARIABLES OPERATOR TRANSLATION
CSAL	CONCEPTUAL SCHEMA ACTION LIST
CSQUAL	CONCEPTUAL SCHEMA QUALIFY LIST
ERRORST	WS DEFINITION FOR ERROR STATUS
ERRPRO	PROCESS ERROR INCLUDE FILE
ISAL	INTERNAL SCHEMA ACTION LIST
ISQUAL	INTERNAL SCHEMA QUALIFY LIST
MACDAT	WS VARIABLES FOR MACRO COPY UTILITY
ORCLEDA	WS DEFINITION FOR THE ORACLE LOGIN AREA
RFTABLE	THE RESULT FIELD TABLE
SBSTLST	WS DEFINITION FOR THE SUBSTITUTION LIST TABLE

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.

GENERATOR SUPPORT ROUTINES Where-include-file-used List

Include File	Module Name	Module Purpose
COBOLOP		
	CDQPOP	CONVERT NDML OPERATOR INTO COBOL OPERATOR
CSAL		
	CDMSG	GENERATE WS CS DATA DEFINITIONS FOR RUNTIME PARAMETERS
CSQUAL		
	CDMSG	GENERATE WS CS DATA DEFINITIONS FOR RUNTIME PARAMETERS
ERRORST		
	CDQPOP	CONVERT NDML OPERATOR INTO COBOL OPERATOR
ERRPRO		
	CDCI	GENERATES WS AND PROC DIV CODE FOR CS TO IS
	CDIC	GENERATES WS AND PROC DIV CODE FOR DF FRO IS TO CS
	CDIMD	RETRIEVES INTERNAL SCHEMA METADATA
	CDMACR	GENERATE MACRO CODE INTO THE NAMED FILE
	CDMSG	GENERATE WS CS DATA DEFINITIONS FOR RUNTIME PARAMETERS
	CDPRM	GENERATE WS IS DATA DEFINTIONS FOR SEARCH PARAMETERS
	CDQDF	GENERATED WS IS DATA DEFINTIONS FOR RETRIEVAL QUAL.

GENERATOR SUPPORT ROUTINES Where-include-file-used List

Include File	Module Name	Module Purpose
	CDRDF	GENERATE WS IS DATA DEFINITIONS FOR RETRIEVED DF'S
ISAL		
	CDMSG	GENERATE WS CS DATA DEFINITIONS FOR RUNTIME PARAMETERS
	CDRDF	GENERATE WS IS DATA DEFINITIONS FOR RETRIEVED DF'S
ISQUAL		
	CDMSG	GENERATE WS CS DATA DEFINITIONS FOR RUNTIME PARAMETERS
	CDPRM	GENERATE WS IS DATA DEFINTIONS FOR SEARCH PARAMETERS
	CDQDF	GENERATED WS IS DATA DEFINTIONS FOR RETRIEVAL QUAL.
MACDAT		
	CDMACR	GENERATE MACRO CODE INTO THE NAMED FILE
ORCLEDA		
	CDCI	GENERATES WS AND PROC DIV CODE FOR CS TO IS
	CDIC	GENERATES WS AND PROC DIV CODE FOR DF FRO IS TO CS
	CDIMD	RETRIEVES INTERNAL SCHEMA METADATA
	CDMACR	GENERATE MACRO CODE INTO THE NAMED FILE

GENERATOR SUPPORT ROUTINES Where-include-file-used List

Include File	Module Name	Module Purpose
RFTABLE		
	CDRFT	GENERATE CS DATA DEFINITION FOR RETRIEVED DF'S
SBSTLST		
	CDMACR	GENERATE MACRO CODE INTO THE NAMED FILE

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.

GENERATOR SUPPORT ROUTINES Where-external-routine-used List

System Module	Module Name	Module Purpose
DELFIL		
	CDCWF	COMBINES WORKFILES FOR QP INTO ONE FILE
ERRPRO		
	CDCI	GENERATES WS AND PROC DIV CODE FOR CS TO IS
	CDIC	GENERATES WS AND PROC DIV CODE FOR DF FRO IS TO CS
	CDIMD	RETRIEVES INTERNAL SCHEMA METADATA
	CDMACR	GENERATE MACRO CODE INTO THE NAMED FILE
	CDMSG	GENERATE WS CS DATA DEFINITIONS FOR RUNTIME PARAMETERS
	CDPRM	GENERATE WS IS DATA DEFINTIONS FOR SEARCH PARAMETERS
	CDQDF	GENERATED WS IS DATA DEFINTIONS FOR RETRIEVAL QUAL.
	CDRDF	GENERATE WS IS DATA DEFINITIONS FOR RETRIEVED DF'S
OBINDN		
	CDCI	GENERATES WS AND PROC DIV CODE FOR CS TO IS
	CDIC	GENERATES WS AND PROC DIV CODE FOR DF FRO IS TO CS
	CDIMD	RETRIEVES INTERNAL SCHEMA METADATA
	CDMACR	GENERATE MACRO CODE INTO THE NAMED FILE
OCLOSE		
	CDCI	GENERATES WS AND PROC DIV CODE FOR CS TO IS
	CDIC	GENERATES WS AND PROC DIV CODE FOR DF FRO IS TO CS
	CDIMD	RETRIEVES INTERNAL SCHEMA METADATA
	CDMACR	GENERATE MACRO CODE INTO THE NAMED FILE

GENERATOR SUPPORT ROUTINES Where-external-routine-used List

System Module	Module Name	Module Purpose
ODFINN		
	CDCI	GENERATES WS AND PROC DIV CODE FOR CS TO IS
	CDIC	GENERATES WS AND PROC DIV CODE FOR DF FRO IS TO CS
	CDIMD	RETRIEVES INTERNAL SCHEMA METADATA
	CDMACR	GENERATE MACRO CODE INTO THE NAMED FILE
OEXEC		
	CDCI	GENERATES WS AND PROC DIV CODE FOR CS TO IS
	CDIC	GENERATES WS AND PROC DIV CODE FOR DF FRO IS TO CS
	CDIMD	RETRIEVES INTERNAL SCHEMA METADATA
	CDMACR	GENERATE MACRO CODE INTO THE NAMED FILE
OFETCH		
	CDCI	GENERATES WS AND PROC DIV CODE FOR CS TO IS
	CDIC	GENERATES WS AND PROC DIV CODE FOR DF FRO IS TO CS
	CDIMD	RETRIEVES INTERNAL SCHEMA METADATA
	CDMACR	GENERATE MACRO CODE INTO THE NAMED FILE
OOPEN		
	CDCI	GENERATES WS AND PROC DIV CODE FOR CS TO IS
	CDIC	GENERATES WS AND PROC DIV CODE FOR DF FRO IS TO CS
	CDIMD	RETRIEVES INTERNAL SCHEMA METADATA
	CDMACR	GENERATE MACRO CODE INTO THE NAMED FILE

GENERATOR SUPPORT ROUTINES Where-external-routine-used List

System Module	Module Name	Module Purpose
OSQL3		
	CDCI	GENERATES WS AND PROC DIV CODE FOR CS TO IS
	CDIC	GENERATES WS AND PROC DIV CODE FOR DF FRO IS TO CS
	CDIMD	RETRIEVES INTERNAL SCHEMA METADATA
	CDMACR	GENERATE MACRO CODE INTO THE NAMED FILE

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 that 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.

GENERATOR SUPPORT ROUTINES Main Program Parts List

Main Pgm Name	Module Name		Module Type
CDCI		Purpose-->	GENERATES WS AND PROC DIV CODE FOR CS TO IS
	CDPIC		Well-defined module
	ERRPRO		External routine
	OBINDN		External routine
	OCLOSE		External routine
	ODFINN		External routine
	OEXEC		External routine
	OFETCH		External routine
	OOPEN		External routine
	OSQL3		External routine

GENERATOR SUPPORT ROUTINES Main Program Parts List

Main Pgm Name	Module Name		Module Type
CDCWF		Purpose--›	COMBINES WORKFILES FOR QP INTO ONE FILE
	DELFIL		External routine

GENERATOR SUPPORT ROUTINES Main Program Parts List

Main Pgm Name	Module Name	Module Type
CDIC	Purpose--›	GENERATES WS AND PROC DIV CODE FOR DF FRO IS TO CS
	CDPIC	Well-defined module
	ERRPRO	External routine
	OBINDN	External routine
	OCLOSE	External routine
	ODFINN	External routine
	OEXEC	External routine
	OFETCH	External routine
	OOPEN	External routine
	OSQL3	External routine

GENERATOR SUPPORT ROUTINES Main Program Parts List

Main Pgm Name	Module Name	Module Type
CDIMD		Purpose-->RETRIEVES INTERNAL SCHEMA METADATA
	ERRPRO	External routine
	OBINDN	External routine
	OCLOSE	External routine
	ODFINN	External routine
	OEXEC	External routine
	OFETCH	External routine
	OOPEN	External routine
	OSQL3	External routine

GENERATOR SUPPORT ROUTINES Main Program Parts List

Main Pgm Name	Module Name	Module Type
CDMACR	Purpose--›	GENERATE MACRO CODE INTO THE NAMED FILE
	ERRPRO	External routine
	OBINDN	External routine
	OCLOSE	External routine
	ODFINN	External routine
	OEXEC	External routine
	OFETCH	External routine
	OOPEN	External routine
	OSQL3	External routine

GENERATOR SUPPORT ROUTINES Main Program Parts List

Main Pgm Name	Module Name	Module Type
CDMSG	Purpose--›	GENERATE WS CS DATA DEFINITIONS FOR RUNTIME PARAMETERS
	CDPIC	Well-defined module
	ERRPRO	External routine

GENERATOR SUPPORT ROUTINES Main Program Parts List

Main Pgm Name	Module Name	Module Type
CDPRM	Purpose--›	GENERATE WS IS DATA DEFINTIONS FOR SEARCH PARAMETERS
	CDPIC	Well-defined module
	ERRPRO	External routine

GENERATOR SUPPORT ROUTINES Main Program Parts List

Main Pgm Name	Module Name		Module Type
CDQDF		Purpose--›	GENERATED WS IS DATA DEFINTIONS FOR RETRIEVAL QUAL.
	CDPIC		Well-defined module
	ERRPRO		External routine

GENERATOR SUPPORT ROUTINES Main Program Parts List

Main Pgm Name	Module Name		Module Type
CDRDF		Purpose--›	GENERATE WS IS DATA DEFINITIONS FOR RETRIEVED DF'S
	CDPIC		Well-defined module
	ERRPRO		External routine

GENERATOR SUPPORT ROUTINES Main Program Parts List

Main Pgm Name	Module Name		Module Type
CDRFT		Purpose--›	GENERATE CS DATA DEFINITION FOR RETRIEVED DF'S
	CDPIC		Well-defined module

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:

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

from the source code.

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.

GENERATOR SUPPORT ROUTINES Module Documentation

NAME: CDCI
PURPOSE: GENERATES WS AND PROC DIV CODE FOR CS TO IS
LANGUAGE: VAX-11 COBOL
MODULE TYPE: SUBROUTINE
SOURCE FILE: CDCI
SOURCE FILE TYPE: .COB
HOST:
SUBSYSTEM: CDM
SUBDIRECTORY:
DOCUMENTATION GROUP: PS41260

DESCRIPTION:

- THIS ROUTINE WILL GENERATE WORKING STORAGE
-

ARGUMENTS:

WORK-FILE-NAME = DSPLY [X(30)]
PROC-FILE-NAME = DSPLY [X(30)]
ORACLE-LDA = RECRD
NEXT-PARAMETER-NO = DSPLY [9(4)]
TABLE-INDEX = DSPLY [999]
DB-ID-TEMP = DSPLY [9(5)]
DF-ID = DSPLY [X(30)]
RT-ID = DSPLY [X(30)]
TAG-NO-TEMP = DSPLY [9(6)]
TRANSACTION-TYPE = DSPLY [X]

INCLUDE FILES:

ORCLEDA - WS DEFINITION FOR THE ORACLE LOGIN AREA
ERRPRO - PROCESS ERROR INCLUDE FILE

ROUTINES CALLED:

OOPEN
OSQL3
ODFINN

OBINDN
OEXEC
OFETCH
CDPIC - GENERATE A PICTURE CLAUSE DATA DEFINITION FOR COBOL IDENTIFIER
OCLOSE
ERRPRO

GENERATOR SUPPORT ROUTINES Module Documentation

NAME: CDCWF
PURPOSE: COMBINES WORKFILES FOR QP INTO ONE FILE
LANGUAGE: VAX-11 COBOL
MODULE TYPE: SUBROUTINE
SOURCE FILE: CDCWF
SOURCE FILE TYPE: .COB
HOST:
SUBSYSTEM: CDM
SUBDIRECTORY:
DOCUMENTATION GROUP: PS41260

DESCRIPTION:

- THIS ROUTINE WILL COMBINE THE TWO WORK FILES USED IN GENERATING THE QUERY PROCESSOR INTO ONE FILE. IT WILL APPEND THE SECOND WORK FILE
-

ARGUMENTS:

WORK-FILE-NAME = DSPLY [X(30)]
PROC-FILE-NAME = DSPLY [X(30)]
HOST = DSPLY [X(3)]

ROUTINES CALLED:

DELFIL

GENERATOR SUPPORT ROUTINES Module Documentation

NAME: CDIC
PURPOSE: GENERATES WS AND PROC DIV CODE FOR DF FRO
IS TO CS
LANGUAGE: VAX-11 COBOL
MODULE TYPE: SUBROUTINE
SOURCE FILE: CDIC
SOURCE FILE TYPE: .COB
HOST:
SUBSYSTEM: CDM
SUBDIRECTORY:
DOCUMENTATION GROUP: PS41260

DESCRIPTION:

- THIS ROUTINE WILL GENERATE WORKING STORAGE
-

ARGUMENTS:

WORK-FILE-NAME = DSPLY [X(30)]
PROC-FILE-NAME = DSPLY [X(30)]
ORACLE-LDA = RECRD
NEXT-PARAMETER-NO = DSPLY [9(4)]
IS-INDEX = DSPLY [999]
DB-ID-TEMP = DSPLY [9(5)]
DF-ID = DSPLY [X(30)]
RT-ID = DSPLY [X(30)]
TAG-NO-TEMP = DSPLY [9(6)]

INCLUDE FILES:

ORCLEDA - WS DEFINITION FOR THE ORACLE LOGIN AREA
ERRPRO - PROCESS ERROR INCLUDE FILE

ROUTINES CALLED:

OOPEN
OSQL3
ODFINN
OBINDN

OEXEC
OFETCH
CDPIC - GENERATE A PICTURE CLAUSE DATA DEFINITION FOR COBOL IDENTIFIER
OCLOSE
ERRPRO

GENERATOR SUPPORT ROUTINES Module Documentation

NAME: CDIMD
PURPOSE: RETRIEVES INTERNAL SCHEMA METADATA
LANGUAGE: VAX-11 COBOL
MODULE TYPE: SUBROUTINE
SOURCE FILE: CDIMD
SOURCE FILE TYPE: .COB
HOST:
SUBSYSTEM: CDM
SUBDIRECTORY:
DOCUMENTATION GROUP: PS41260

DESCRIPTION:

- THIS ROUTINE WILL USE AN INTERNAL DATA FIELD NAME, DATA BASE ID AND RECORD ID AND ACCESS THE CDM FOR FOR ITS INTERNAL TYPE,SIZE AND NUMBER OF DECIMAL DIGITS.

-

ARGUMENTS:

ORACLE-LDA = RECRD
DBID-TEMP = DSPLY [9(5)]
RTID = DSPLY [X(30)]
DFID = DSPLY [X(30)]
IS-TYPE = DSPLY [X]
SIZE-TEMP = DSPLY [9(3)]
ND-TEMP = DSPLY [99]
ERROR-STATUS = DSPLY [X(5)]

INCLUDE FILES:

ORCLEDA - WS DEFINITION FOR THE ORACLE LOGIN AREA
ERRPRO - PROCESS ERROR INCLUDE FILE

ROUTINES CALLED:

OOPEN
OSQL3

ODFINN
OBINDN
OEXEC
OFETCH
OCLOSE
ERRPRO

GENERATOR SUPPORT ROUTINES Module Documentation

NAME: CDMACR
PURPOSE: GENERATE MACRO CODE INTO THE NAMED FILE
LANGUAGE: VAX-11 COBOL
MODULE TYPE: SUBROUTINE
SOURCE FILE: CDMACR
SOURCE FILE TYPE: .COB
HOST:
SUBSYSTEM: CDM
SUBDIRECTORY:
DOCUMENTATION GROUP: PS41260

DESCRIPTION:

- THIS SUBPROGRAM WILL GENERATE CODE AS DOES A MACRO EXPANDER INTO THE NAMEDFILE. A LIBRARY NAME AND A MODULE NAME ARE INPUT ALONG WITH A SUBSTITUTION PARAMETER LIST. THE MACRO DEFINITIONS ARE FOUND ON A DATA BASE. THIS IS USED INSTEAD OF COPY AND REPLACING STATEMENTS, IS MORE GENERALIZED AND FLEXIBLE.

-

ARGUMENTS:

FILE-NAME = DSPLY [X(30)]
ORACLE-LDA = RECRD
LIBRARY-NAME = DSPLY [X(30)]
MACRO-NAME = DSPLY [X(8)]
SUBSTITUTION-LIST = RECRD

INCLUDE FILES:

ORCLEDA - WS DEFINITION FOR THE ORACLE LOGIN AREA
MACDAT - WS VARIABLES FOR MACRO COPY UTILITY
SBSTLST - WS DEFINITION FOR THE SUBSTITUTION LIST TABLE
ERRPRO - PROCESS ERROR INCLUDE FILE

ROUTINES CALLED:

```
OOPEN
OSQL3
ODFINN
OBINDN
OEXEC
OCLOSE
OFETCH
ERRPRO
```

GENERATOR SUPPORT ROUTINES Module Documentation

NAME: CDMSG
PURPOSE: GENERATE WS CS DATA DEFINITIONS FOR RUNTIME PARAMETERS
LANGUAGE: VAX-11 COBOL
MODULE TYPE: SUBROUTINE
SOURCE FILE: CDMSG
SOURCE FILE TYPE: .COB
HOST:
SUBSYSTEM: CDM
SUBDIRECTORY:
DOCUMENTATION GROUP: PS41260

DESCRIPTION:

- THIS ROUTINE WILL GENERATE THE WORKING STORAGE CONCEPTUAL DATA DEFINITIONS REQUIRED FOR THE RUNTIME SEARCH PARAMETERS.

-

ARGUMENTS:

WORKFILE = DSPLY [X(30)]
SUBTRANS-ID = DSPLY [9(3)]
CS-QUALIFY-LIST = RECRD
IS-QUALIFY-LIST = RECRD
IS-ACTION-LIST = RECRD
CS-ACTION-LIST = RECRD

INCLUDE FILES:

CSQUAL	- CONCEPTUAL SCHEMA QUALIFY LIST
ISQUAL	- INTERNAL SCHEMA QUALIFY LIST
ISAL	- INTERNAL SCHEMA ACTION LIST
CSAL	- CONCEPTUAL SCHEMA ACTION LIST
ERRPRO	- PROCESS ERROR INCLUDE FILE

ROUTINES CALLED:

CDPIC	- GENERATE A PICTURE CLAUSE DATA DEFINITION FOR

COBOL IDENTIFIER

ERRPRO

GENERATOR SUPPORT ROUTINES Module Documentation

NAME: CDPIC
PURPOSE: GENERATE A PICTURE CLAUSE DATA DEFINITION FOR COBOL IDENTIF
LANGUAGE: VAX-11 COBOL
MODULE TYPE: SUBROUTINE
SOURCE FILE: CDPIC
SOURCE FILE TYPE: .COB
HOST:
SUBSYSTEM: CDM
SUBDIRECTORY:
DOCUMENTATION GROUP: PS41260

DESCRIPTION:

THIS SUBROUTINE WILL GENERATE A PICTURE CLAUSE DATA DEFINITION FOR A COBOL IDENTIFIER ACCORDING TO IT'S TYPE,SIZE(AND DECIMAL POINT).
FOR EXAMPLE :
9(010).
X(20).
S9(010)V(02).
9(008)V(02).

THE INPUT PARAMETERS OF THIS SUBROUTINES ARE
1. IDENTIFIER TYPE
2. IDENTIFIER SIZE(LENGTH)
3. IDENTIFIER LENGHT OF DECIMAL POINT
(IF IDENTIFIER IS PIC 9 TYPE).

THE OUTPUT OF THIS SUBROUTINE IS IN PIC-CLAUSE VARIABLE

ARGUMENTS:

ID-TYPE = DSPLY [X]
ID-SIZE = DSPLY [999]
NO-DEC = DSPLY [99]
PIC-CLAUSE = DSPLY [X(30)]

CALLED DIRECTLY BY:

CDCI	- GENERATES WS AND PROC DIV CODE FOR CS TO IS
CDIC	- GENERATES WS AND PROC DIV CODE FOR DF FRO IS TO CS
CDMSG	- GENERATE WS CS DATA DEFINITIONS FOR RUNTIME PARAMETERS
CDPRM	- GENERATE WS IS DATA DEFINTIONS FOR SEARCH PARAMETERS
CDQDF	- GENERATED WS IS DATA DEFINTIONS FOR RETRIEVAL QUAL.
CDRDF	- GENERATE WS IS DATA DEFINITIONS FOR RETRIEVED DF'S
CDRFT	- GENERATE CS DATA DEFINITION FOR RETRIEVED DF'S

USED IN MAIN PROGRAM(S):

CDCI	- GENERATES WS AND PROC DIV CODE FOR CS TO IS
CDIC	- GENERATES WS AND PROC DIV CODE FOR DF FRO IS TO CS
CDMSG	- GENERATE WS CS DATA DEFINITIONS FOR RUNTIME PARAMETERS
CDPRM	- GENERATE WS IS DATA DEFINTIONS FOR SEARCH PARAMETERS
CDQDF	- GENERATED WS IS DATA DEFINTIONS FOR RETRIEVAL QUAL.
CDRDF	- GENERATE WS IS DATA DEFINITIONS FOR RETRIEVED DF'S
CDRFT	- GENERATE CS DATA DEFINITION FOR RETRIEVED DF'S

GENERATOR SUPPORT ROUTINES Module Documentation

NAME: CDPRM
PURPOSE: GENERATE WS IS DATA DEFINTIONS FOR SEARCH PARAMETERS
LANGUAGE: VAX-11 COBOL
MODULE TYPE: SUBROUTINE
SOURCE FILE: CDPRM
SOURCE FILE TYPE: .COB
HOST:
SUBSYSTEM: CDM
SUBDIRECTORY:
DOCUMENTATION GROUP: PS41260

DESCRIPTION:

- THIS ROUTINE WILL GENERATE THE WORKING STORAGE INTERNAL DATA DEFINITIONS REQUIRED FOR THE RUN TIME SEARCH PARAMETERS.

-

ARGUMENTS:

WORKFILE = DSPLY [X(30)]
SUBTRANS-ID = DSPLY [9(3)]
IS-QUALIFY-LIST = RECRD

INCLUDE FILES:

ISQUAL - INTERNAL SCHEMA QUALIFY LIST
ERRPRO - PROCESS ERROR INCLUDE FILE

ROUTINES CALLED:

CDPIC - GENERATE A PICTURE CLAUSE DATA DEFINITION FOR COBOL IDENTIFIER
ERRPRO

GENERATOR SUPPORT ROUTINES Module Documentation

NAME: CDQDF
PURPOSE: GENERATED WS IS DATA DEFINTIONS FOR RETRIEVAL QUAL.
LANGUAGE: VAX-11 COBOL
MODULE TYPE: SUBROUTINE
SOURCE FILE: CDQDF
SOURCE FILE TYPE: .COB
HOST:
SUBSYSTEM: CDM
SUBDIRECTORY:
DOCUMENTATION GROUP: PS41260

DESCRIPTION:

- THIS ROUTINE WILL GENERATE THE WORKING STORAGE INTERNAL DATA DEFINITIONS FOR THE DATA FIELDS THAT WILL BE USED FOR RETRIEVED QUALIFICATION.

-

ARGUMENTS:

WORK-FILE-NAME = DSPLY [X(30)]
SUBTRANS-ID = DSPLY [9(3)]
IS-QUALIFY-LIST = RECRD

INCLUDE FILES:

ISQUAL - INTERNAL SCHEMA QUALIFY LIST
ERRPRO - PROCESS ERROR INCLUDE FILE

ROUTINES CALLED:

CDPIC - GENERATE A PICTURE CLAUSE DATA DEFINITION FOR COBOL IDENTIFIER
ERRPRO

GENERATOR SUPPORT ROUTINES Module Documentation

NAME: CDQPOP
PURPOSE: CONVERT NDML OPERATOR INTO COBOL OPERATOR
LANGUAGE: VAX-11 COBOL
MODULE TYPE: SUBROUTINE
SOURCE FILE: CDQPOP
SOURCE FILE TYPE: .COB
HOST:
SUBSYSTEM: CDM
SUBDIRECTORY:
DOCUMENTATION GROUP: PS41260

DESCRIPTION:

- THIS PROGRAM CONVERTSAN NDML OPERATOR INTO COBOL EQUIVAL

-

ARGUMENTS:

NDML-OP = DSPLY [XX]
COBOL-OP = DSPLY [X(10)]
ERROR-STATUS = DSPLY [9]

INCLUDE FILES:

COBOLOP - WORKING STORAGE VARIABLES OPERATOR TRANSLATION
ERRORST - WS DEFINITION FOR ERROR STATUS

GENERATOR SUPPORT ROUTINES Module Documentation

NAME: CDRDF
PURPOSE: GENERATE WS IS DATA DEFINITIONS FOR RETRIEVED DF'S
LANGUAGE: VAX-11 COBOL
MODULE TYPE: SUBROUTINE
SOURCE FILE: CDRDF
SOURCE FILE TYPE: .COB
HOST:
SUBSYSTEM: CDM
SUBDIRECTORY:
DOCUMENTATION GROUP: PS41260

DESCRIPTION:

- THIS ROUTINE WILL GENERATE THE WORKING STORAGE INTERNAL DATA DEFINITIONFOR THE RETRIEVED DATA FIELDS THAT WILL BE USED IN CONVERTING INTERNAL FORMAT TO CONCEPTUAL FORMAT.

-

ARGUMENTS:

WORKFILE = DSPLY [X(30)]
SUBTRANS-ID = DSPLY [9(3)]
IS-ACTION-LIST = RECRD

INCLUDE FILES:

ISAL - INTERNAL SCHEMA ACTION LIST
ERRPRO - PROCESS ERROR INCLUDE FILE

ROUTINES CALLED:

CDPIC - GENERATE A PICTURE CLAUSE DATA DEFINITION FOR COBOL IDENTIFIER
ERRPRO

GENERATOR SUPPORT ROUTINES Module Documentation

NAME: CDRFT
PURPOSE: GENERATE CS DATA DEFINITION FOR RETRIEVED DF'S
LANGUAGE: VAX-11 COBOL
MODULE TYPE: SUBROUTINE
SOURCE FILE: CDRFT
SOURCE FILE TYPE: .COB
HOST:
SUBSYSTEM: CDM
SUBDIRECTORY:
DOCUMENTATION GROUP: PS41260

DESCRIPTION:

- ?

THIS SUBROUTINE LOOP THROUGH THE RFT TABLE TO GENERATE THE COBOL IDENTIFIER FOR EACH ENTRY IN THE TABLE, FOR EXAMPLE :

```
01  RESULT-REC.
03  RES-001            PIC X(20).
03  RES-002            PIC 9(4).
```

-

ARGUMENTS:

WORKFILE-NAME -
SUBTRANS-ID -
RFT -

INCLUDE FILES:

RFTABLE - THE RESULT FIELD TABLE

ROUTINES CALLED:

CDPIC - GENERATE A PICTURE CLAUSE DATA DEFINITION FOR COBOL IDENTIFIER

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.

GENERATOR SUPPORT ROUTINES Include File Description

FILE NAME: COBOLOP
PURPOSE: WORKING STORAGE VARIABLES OPERATOR TRANSLATION
LANGUAGE: VAX-11 COBOL

DESCRIPTION:

GENERATOR SUPPORT ROUTINES 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

GENERATOR SUPPORT ROUTINES 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

GENERATOR SUPPORT ROUTINES Include File Description

FILE NAME: ERRORST
PURPOSE: WS DEFINITION FOR ERROR STATUS
LANGUAGE: VAX-11 COBOL

DESCRIPTION:

ERROR STATUS VARIABLE

GENERATOR SUPPORT ROUTINES Include File Description

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

DESCRIPTION:

GENERATOR SUPPORT ROUTINES 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

GENERATOR SUPPORT ROUTINES Include File Description

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

DESCRIPTION:

CONTAINS INTERNAL SCHEMA INFORMATION FOR AN
NDML QULIFICATION

THE INTERNAL SCHEMA QUALIFY LIST

GENERATOR SUPPORT ROUTINES Include File Description

FILE NAME: MACDAT
PURPOSE: WS VARIABLES FOR MACRO COPY UTILITY
LANGUAGE: VAX-11 COBOL

DESCRIPTION:

GENERATOR SUPPORT ROUTINES Include File Description

FILE NAME: ORCLEDA
PURPOSE: WS DEFINITION FOR THE ORACLE LOGIN AREA
LANGUAGE: VAX-11 COBOL

DESCRIPTION:

THE ORACLE LOGON DATA AREA

GENERATOR SUPPORT ROUTINES 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
LINKAGE SECTION OF THE DRS (CDS01)
WHICH WAS COPIED FROM THIS.

GENERATOR SUPPORT ROUTINES Include File Description

FILE NAME: SBSTLST
PURPOSE: WS DEFINITION FOR THE SUBSTITUTION LIST TABLE
LANGUAGE: VAX-11 COBOL

DESCRIPTION:

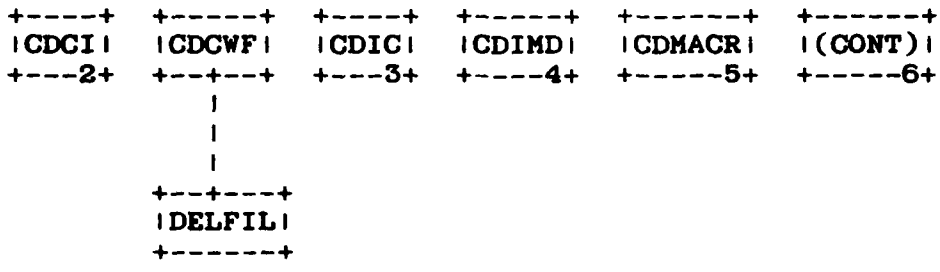
SUBSTITUTION-LIST REPRESENTS THE INPUT TABLE
OF SUBSTITUTION PARAMETERS FOR THE CDMACR
MACRO EXPANSION SUBROUTINE

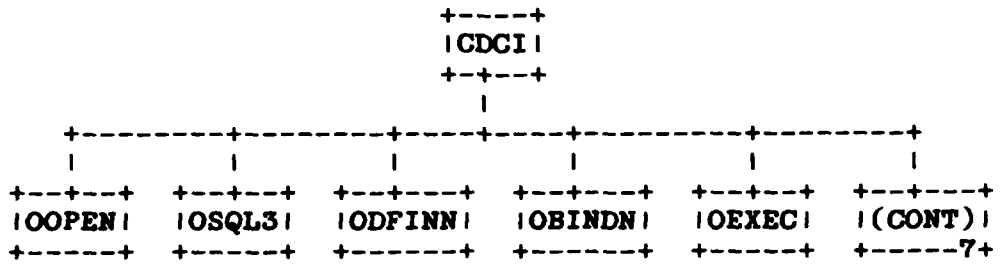
3.10.10 Hierarchy Chart

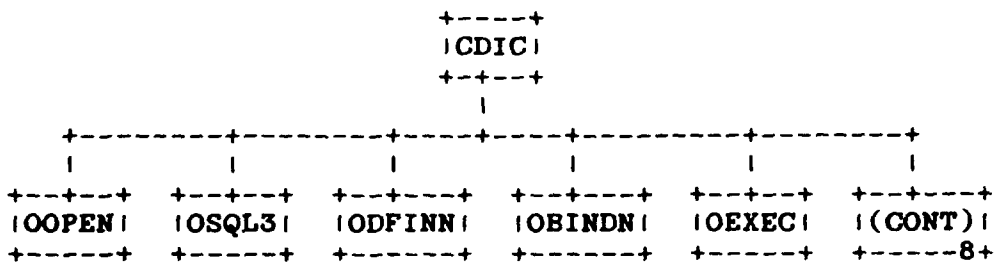
The following hierarchy charts show the relationships between all of the modules mentioned in the above documentation. A module may call a subroutine several times within its code, but the call will only be shown once as a single relationship on this hierarchy chart. All modules shown at the top of the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

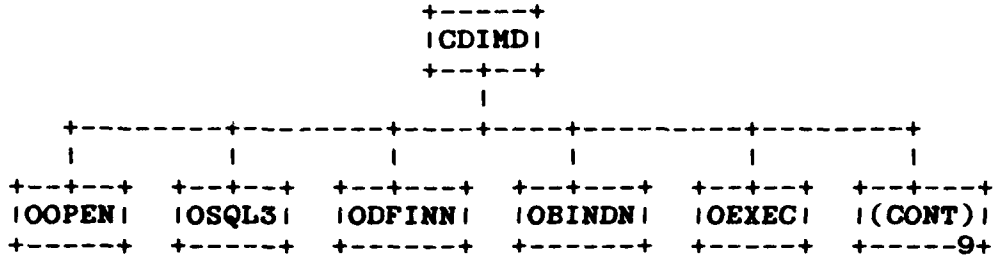
1



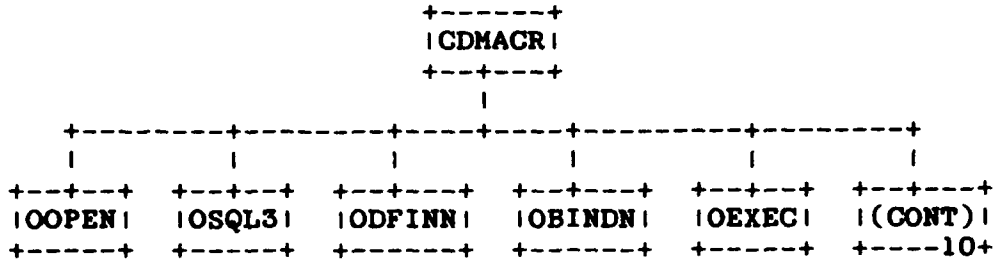

CDCI
OOPEN
OSQL3
ODFINN
OBINDN
OEXEC
(CONT)


CDIC
OOPEN
OSQL3
ODFINN
OBINDN
OEXEC
(CONT)
8

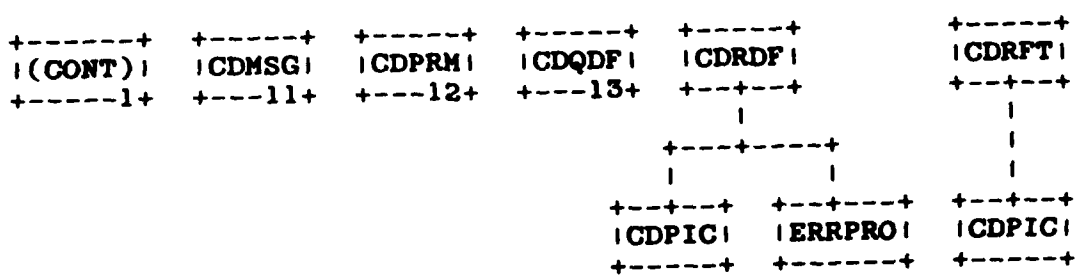
4

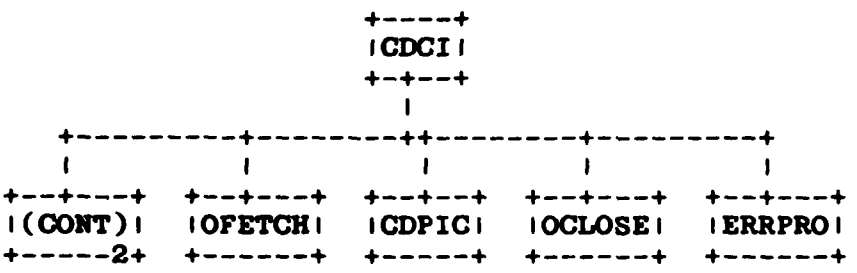


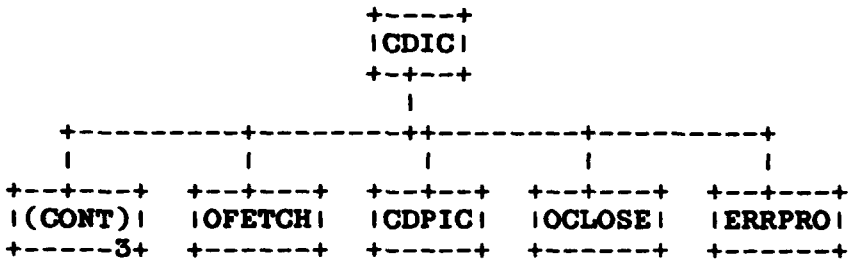
5

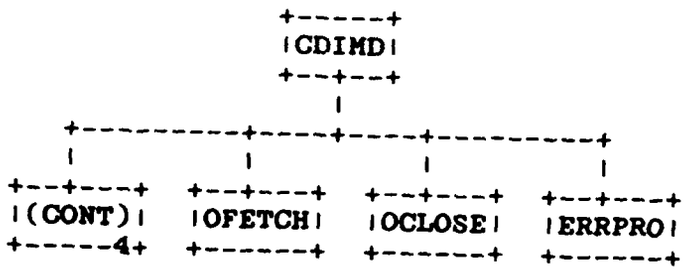


6

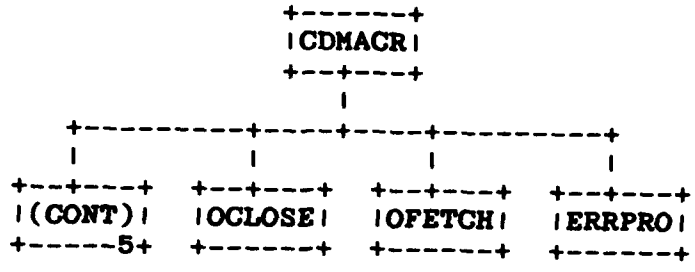


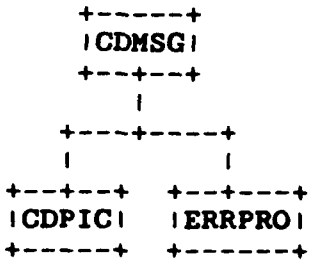

CDCI
(CONT)
OFETCH
CDPIC
OCLOSE
ERRPRO
2

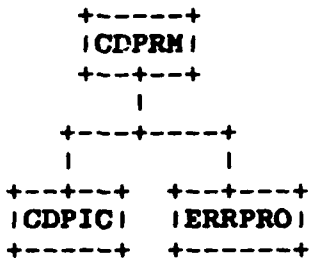

CDIC
(CONT)
OFETCH
CDPIC
OCLOSE
ERRPRO

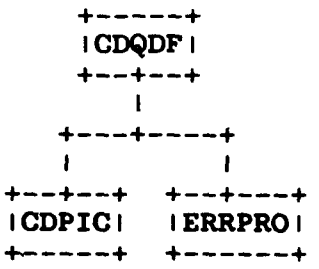

CDIMD
(CONT)
OFETCH
OCLOSE
ERRPRO

10




CDMSG
CDPIC
ERRPRO


CDPRM
CDPIC
ERRPRO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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."

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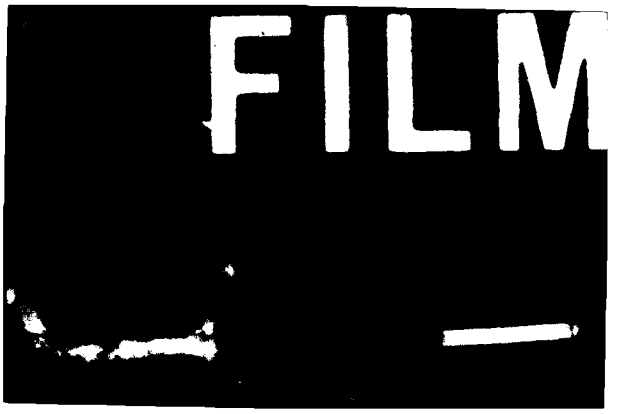
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