



User Manual

**MDXREF**

Application Analysis Tool  
from  
Midrange Dynamics

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## 1 Overview of the MDXREF Manual

The purpose of this manual is to provide a fundamental understanding of how to use the **MDXREF** product from Midrange Dynamics. **MDXREF** is a tool that runs directly on the IBM i (iSeries, AS/400) to help you easily navigate through your software application source/objects and their relationships to each other.

This manual focuses on how to administer and use MDXREF from a 5250 emulator session (green screen). Additional MDXREF capabilities are available from MDOpen, a plugin for eclipse/Rational Developer for i. Reference the MDOpen User Manual for instructions on using the MDOpen client for MDXREF functions. The manual is available here: <https://wiki.mdcms.ch/display/MDKB/MDOpen+User+Manual>

### 1.1 Common Function Keys and their usage throughout MDXREF

**Enter** – process all entered information on the current screen. For example, from the first screen, press Enter to then display all objects that match the filter values entered on the first screen.

**F3** - exit MDXREF from Screen 1; otherwise, exit to previous process within MDXREF.

**F4** - browse a list of possible values for a field upon which the cursor is located. Most entry-capable Fields may be browsed in MDXREF.

**F5** – refresh the information in the list

**F11** – view the output generated by reports within MDXREF or work with all spooled files for your user profile.

**F15** – available on all screens that display a list. F15 creates an electronic report based on the selection values in the listing screen. F11 can then be pressed to view/print/export the output.

**F21** – provides a command line for the entry of IBMi commands



## 2 Setup MDXREF

MDXREF is packaged as part of MDCMS, but can run as a standalone product if only licensing the MDXREF functionality.

Prior to setting up MDXREF, it is recommended to perform the following from the MDCMS Setup Menu:

- Option 1 – Application Groups to define one or more codes that represent an application to be cross-referenced.
- Option 2 – Promotion Levels to define each specific environment (Dev Test, Q/A, Production etc...) for an application.
- Option 11 – System Settings to define the java settings for report output handling
- Option 12 – Email Settings to be able to email MDXREF reports to recipients.

Refer to the MDCMS manual for complete instructions.

### 2.1 Authorizing Users to run MDXREF

MDSEC is included with MDXREF and is used to administer the list of authorized MDXREF users. MDSEC administration can be performed by using command MDSEC.

To modify the list of authorized users, you must have either \*SECADM or \*SECOFR authority, or have been granted administration authority within MDSEC.

MDXREF is controlled by MDSEC application md.

Administrators will require General Access + codes 1, 3, 4, 11, 12, 13, 14 and 15 which are all contained in the default definition for MDSEC User Role MD\_ADMXREF.

General users of MDXREF will require General Access + code 1 which are contained in the default definition for MDSEC User Role MD\_USER.

Refer to the MDSEC documentation for complete instructions.

### 2.2 Setting the License Key

A unique 16-character license key is required to fully run products from Midrange Dynamics. The key is based partly upon the serial number and partition ID of the licensed IBMi partition. Midrange Dynamics will provide you with the license key for your IBMi at the time of purchase.

If you replace your existing IBMi, or the existing License Key has expired, please contact Midrange Dynamics and a new License Key will be provided. You will be automatically prompted for the license key at install time or whenever the existing key is no longer valid. You can also view/change the key at any time from the MDSEC menu.



### 3 Building the MDXREF Database

Before information can be used in MDXREF, it must be retrieved using the Build process. The amount of time that the Build requires depends on the size of the libraries involved in the Build. On a typical production IBMi, the Build would require ~15 minutes to complete the database for 1000 files and 2500 programs.

The entire database, individual applications, individual libraries, or individual objects can then be rebuilt at any time if a manual change to the objects occurs. If **MDCMS** is used to change objects, then MDXREF is automatically updated and a rebuild is not required.

The Build process is invoked by pressing **F9** from MDXREF Screen titled **Cross-Reference Display** (MDC2KXF). If **F9** is not allowed for you, then administration authorization has not been granted to you through **MDSEC**. See the *Authorizing Users to run MDXREF* in section 2.1 for more details.

#### 3.1 Application/Level Selection

```

MDCINXF                               Company Name                               16.03.15
SCRN1                                  Application/Level Selection              18:42:55

Filter by Lvl: ___  Library: _____

Type options, press Enter.
  L=Libraries  P=Periodic Update  T=Table Defs  X=XREF Level  2=Edit  4=Delete
Pos:
Opt  Appl  Lvl  Description                               Oldest Build  Tab  XA
-    ACCT  10  Test Env                               16.03.15      Y
-    ACCT  50  Prod Env                               not built      Y

                                                                 Bottom
F3=Exit  F4=Browse  F5=Refresh  F6=Add Level  F10=XREF All Levels
  
```

**Opt**

L	view/edit the list of libraries to include for the Application Level
P	create a scheduled job to periodically update all libraries listed with the Application Level. The ADDJOBSCDE command is invoked with the necessary parameters to create the job. The update may be scheduled through this job to occur daily, weekly, or monthly. In order to edit or delete the scheduled job, use the command WRKJOBSCDE.
T	view/edit the Table Object Definitions. Table Object Definitions allow for cross-referencing between soft components (table records) and objects
X	Perform a one-time build or rebuild of the MDXREF database for all libraries listed within the selected Application Level. You will then be prompted for the job queue and scheduled date/time for the build job.
9	Link X-Analysis Data Libraries to MDXREF Levels. X-Analysis is an application modelling product from Fresche Legacy. If a link exists, then when MDCMS installs an object into the Application Level, the information for that object will be refreshed in that instance of X-Analysis. This option is only applicable if MDCMS is installed.



**Appl**

An Application is an In-House or 3<sup>rd</sup> party Software Product that resides on the IBMi.

**Lvl**

A Level is a coherent grouping of libraries, or application environment, that a cross-reference is to be built over. This usually resembles the library list of an application’s job at runtime. For example, the application ACCT may have a level 10 for test libraries and 90 for production libraries.

If the relevant application or level isn’t in the list, add it from the MDCMS Setup Menu.

**Oldest Build**

The oldest build date for the list of libraries referenced by the level

**Tab**

Y=One or more Table Definitions exist for the given Appl/Lvl

**XA**

Y=One or more X-Analysis Libraries are linked to the given Appl/Lvl

**Function Keys:**

**F4** – Browse list of referenced libraries once cursor is placed on Filter by Library field

**F5** – Refresh the list

**F6** – Add a new Application Level. If MDXREF is installed as part of MDCMS, the level must be added from the MDCMS Setup menu.

**F10** – Submit a single job to refresh the MDXREF information for all libraries defined across all application levels.

**3.2 Libraries to cross-reference**

```

MDRINXF                                COMPANY NAME                                10/27/16
SCRN2                                  Libraries to XREF for Level                                10:37:00
                                           Filter By
Appl/Lvl: ACCT 99  Accounting Production                Library: _____
                                           Description: _____

Type options, press Enter.
O=XREF Object  P=Periodic Update  T=Table Defs  X=XREF Library  4=Delete
Pos  _____
Opt  Sort  Library  Description  Status  Last XREF  Elapsed
     _____  _____  _____  _____  _____  _____
     10  TSTLIBMOD  library with test modules  BUILT  16.03.15  24
     20  TSTOBJ10  objects  BUILT  16.03.15  19
     30  TSTSRC10  source  BUILT  16.03.15  4
     _____
     _____
     _____
     _____
     _____
     _____
     _____
                                           More...

F3=Exit  F4=Browse  F5=Refresh  F8=Retrieve JOBD Libl
  
```

This screen displays the current listing of defined libraries within an Application and Level. It is accessed by option L from the Level listing. It also allows the user to add or remove libraries from the listing if they are authorized to MDSEC Code 4 for the application.



A library should be included for an Application and Level if it is part of the run-time library list for that level.

The same library may be included for many levels, which is common when delta libraries are used. When the library cross reference is selected to be built for one level, that information is automatically updated for all other levels that the library is defined in.

The libraries should be sorted in the same order as the run-time library list for the level.

**Opt**

O	Build the Cross-Reference information for a specific object in the library
P	create a scheduled job to periodically update the library. The ADDJOBSCDE command is invoked with the necessary parameters to create the job. The update may be scheduled through this job to occur daily, weekly, or monthly. In order to edit or delete the scheduled job, use the command WRKJOBSCDE.
T	view/edit the Table Object Definitions. Table Object Definitions allow for cross-referencing between soft components (table records) and objects
X	Perform a one-time build or rebuild of the MDXREF database for the library. You will then be prompted for the job queue and scheduled date/time for the build job.
4	Remove the library from the list and delete all cross-referencing information for the library.

**Sort**

The 4-digit numerical sequence to sort the libraries within the library list. The libraries should be sorted in ascending order in the same sequence as the libraries at run-time. This ensures that MDXREF selects the correct version of a source or object when it exists in multiple libraries. If F8 is used to load the library list from the job description, the sort sequence will be automatically applied.

**Library**

A library may be added to the library list by entering the name of the library on a blank line. F4 may be pressed to browse the list of user libraries on the system. Multiple libraries may be simultaneously selected from the browse screen.

**\*AJSE** – Advanced Job Scheduler Job entries can be included in the Cross-Reference database by including library \*AJSE.

**\*GIT** – Source that is stored in Git repositories can be directly inspected for SQL and system object references. The definition of the Git repositories and the types of source to inspect are maintained from MDOpen->Settings->Git Repositories. Having \*GIT registered as a library in MDXREF provides a means to have all defined Git repositories re-checked for references on a scheduled or on-demand basis.

**\*IFS** – Build a list of all folders and files in the IFS file system. This information can then be viewed from MDOpen, the MD Plug-in for Eclipse/Rational Developer for i (RD i).

If only the files and subfolders of a specific folder should be refreshed, this can be performed directly from the MDXREF IFS view in MDOpen by right-clicking on a folder and selecting option Refresh.

In addition to building the contents of the IFS folders, referencing from various open-source language files (such as java, php and python) to system objects is also added. Open source files will only be considered if configured for referencing within MDOpen.

**\*IFSMD** – Build a list of all folders and files that are defined as relevant in MDCMS or MDOpen, but ignore all other folders. This is recommended if too many files are defined in the IFS on the system to complete the cross-referencing in a timely manner. The following folders are considered:



- Target Folders for \*IFS attributes and attributes with \*IFS source in MDCMS
- Replication Folders for \*IFS attributes and attributes with \*IFS source in MDCMS
- \*IFS search template folders
- The /MDCMS folder
- Folders defined in MDOpen to contain open source files to be cross-referenced

**\*IWS** - REST and SOAP Web Services that are deployed to the IBM Integrated Web Services Server can be added to the Cross-Reference database by including library \*IWS. This will list each deployed service for each existing IWS Server along with the attribute of REST or SOAP and the reference to the ILE program or Service Program that the service invokes.

**\*ROBOT** – If the Help/Systems job scheduling product, ROBOT/Schedule, is installed on the system, it’s jobs can be included in the Cross-Reference database by including library \*ROBOT.

**\*SCDE** – Job Scheduled entries can be included in the Cross-Reference database by including library \*SCDE.

**\*SVN** – Source that is stored in SVN (Subversion) repositories can be directly inspected for SQL and system object references. The definition of the SVN repositories and the types of source to inspect are maintained from MDOpen->Settings->SVN Repositories.

Having \*SVN registered as a library in MDXREF provides a means to have all defined SVN repositories re-checked for references on a scheduled or on-demand basis.

**Status**

PEND	The Cross-Reference build job has been submitted and will process the library once the prior libraries in the list have been built
FAILED	The Cross-Reference build job ended abnormally and should be resubmitted
ACTIVE	The Cross-Reference build job is actively cross referencing the library
BUILT	The Library has been completely cross-referenced

**Last XREF**

The most recent date that a full cross reference build has been performed on the library. If all changes to the library are made by MDCMS, the data will still be accurate even if the build date is quite old.

**Elapsed Time**

The amount of time in hours:minutes:seconds that MDXREF required to process that library. If the status is ACTIVE, then it is the amount of time that has elapsed so far.

**Function Keys:**

**F4** – Browse list of libraries to select one or more for this Application Level

**F8** – Load the library list defined for the job description for the. Any libraries not already in the build list are then added to the end of the list and all libraries are resorted based on the order of the libraries in the job description.





### 3.3 Table Object Definitions

Table Object Definitions provide the ability to describe objects and references defined in Tables. Such Soft Component tables are typically found in 4GLs, Case Tools, Middleware processes and Table-Driven menus.

The values of a field in a table can be identified as an Object and a 2nd field in the same or different table can be identified as the object description. Each Object generated by the definition is presented in the MDXREF screens and reports with object type \*RT(table id).

Any number of additional table fields can be identified as object or file references. All tables can be linked by object name or join field values and SQL conditions can be defined.

#### 3.3.1 Table Object Definition Listing

MDCTBLO	COMPANY NAME		21.04.13
SCRN1	Table Object Definitions		13:55:14
Filters:			
Appl	Lvl	Table ID	Description
MD	10		
Type options, press Enter.			
2=Edit	3=Copy	4=Delete	5=Display
D=Desc Def	R=Reference Defs	X=XREF	
Opt	Appl	Lvl	Table ID
-	MD	10	OPEN
-	MD	10	WFLW
			Description
			File
			Library
			MDOpen Functions
			MDDRFUN
			MDWorkflow Functions
			MDDRFUN
			MDREPT
			MDREPT
			Bottom
F3=Exit	F4=Browse	F5=Refresh	F6=Add

This screen displays the current list of Table Definitions. It is accessed by option T from the Level listing or Library listing. It also allows the user to add, edit or remove definitions from the listing if they are authorized to MDSEC Code 4 for the application.

#### Filters

The rows that are listed can be limited to those rows that match the values in the filters. F4 can be used to select a value from a list for all except the Description filter.

The Description filter will list a row where the filter value appears anywhere within the Table description.

#### Opt

2	Edit a Table Object definition
3	Create a new Table Object definition based on the values of the selected definition. If the new Table ID is the same as the existing Table ID, the Description and Reference definitions will also be copied and the library name will be automatically updated. Otherwise, only the Object definition is copied.
4	Delete a Table Object definition
5	Display a Table Object definition
D	View/Edit the Description definition for the objects
R	View/Edit the Reference definitions for the objects
X	Build the Cross-Reference information for the specific Table Object Definition

#### Function Keys:



- F4** – Browse list of valid values for a filter field
- F5** – Refresh the list
- F6** – Add a new Table Object definition

### 3.3.2 Table Object Definition Detail

MDCTBLO	MD Dev	5.06.17
SCRN2	Edit Table Object Definition	11:08:39
Appl/Level . . .	MD 12	
Table ID . . .	OPEN	
Description . .	<u>MDOpen Functions</u>	
File . . . . .	<u>MDDRFUN</u>	*CONSTANT = 1 Object with fixed Name
Library . . . .	<u>MDREPT8</u>	
Object . . . . .	<u>MDFUN</u>	
Join Field . .	<u>MDPGM</u>	
Condition . . .	<u>MDFUN NOT LIKE "W%"</u>	
Enter=Confirm F4=Browse F8=Test Definition F12=Previous		

This screen contains the parameters to describe a Table Object.

**Application**

The MDXREF Application to contain the Table Object definition

**Level**

The MDXREF Application Level to contain the Table Object definition

**Table ID**

The Table ID is a 4-character code to uniquely identify the Table Object Definition for the Level. The resulting objects are assigned the Object Type \*RT(Table ID) and the Object Attribute RT(Table ID)

**Description**

A description of the Table Object Definition. If a Description definition is not defined for the Table ID, the description is also displayed in the MDXREF screens for the resulting objects.

**File**

The File name and Library of the Table that contains the Object names.

\*CONSTANT – results in one Object named in the Object field



**Object**

If a file is defined, this field contains the SQL syntax for the resulting object names of the table objects.

The name can be any combination of field names that exist in the file plus any constants. Use SQL word CONCAT to combine values, function SUBSTR to use a portion of a field, and function DIGITS to convert a numeric value to an alphanumeric value.

Constants should be surrounded by the double-quote (") value.

Any other SQL accepted syntax and functions may also be used here or for any field variable within the Table Definitions configuration.

If \*CONSTANT is used for the file, this field contains the name of the object (without quotes).

**Join Field**

If the Object definition file uses a separate field to join the definition to the file containing the Description definition or Reference Definition, this field (or SQL result column) can be entered here.

**Condition**

A valid SQL condition (without the WHERE clause) can be defined to limit the records in the file to those matching the condition.

**Function Keys:**

**F4** – Browse list of valid values for a field

**F8** – immediately run a test to ensure that the definition produces the expected results



**3.3.3 Table Object Description Definition Detail**

MDCTBLD	MD Dev			5.06.17	
SCRN1	Table Object Description Definition			11:25:57	
Appl Lvl	Table ID	Description	File	Library	
MD	12	OPEN	MDDRFUN	MDREPT8	
File . . . .	<u>MDDRTXT</u>				
Library . .	<u>MDREPT8</u>				
Description .	<u>MDTEXT</u>				
Join Field .	<u>MDKEY1</u>				
Join Target .	<u>J</u> J=Object Join Field, N=Object Name Field				
Condition . .	<u>MDTYPE = "S"</u>				
Enter=Confirm    F4=Browse    F8=Test Definition    F12=Previous    F22=Delete Def					

This screen contains the parameters to attach a Description to each object for a Table ID. If a description definition isn't created, then the description of the table definition itself is used for the resulting objects in MDXREF.

**File**

The File name and Library of the Table that contains the Object descriptions

**Description**

The SQL result column that contains the descriptions.

**Join Field**

The SQL result column used to join the definition to the file containing the Object definition

**Join Target**

J – The join field for the Description definition is joined to the join field for the Object definition  
N – The join field for the Description definition is joined to the Object Name field for the Object definition

**Condition**

A valid SQL condition (without the WHERE clause) can be defined to limit the records in the file to those matching the condition.

MDXREF takes the Description value from the first row found

**Function Keys:**

- F4** – Browse list of valid values for a field
- F8** – immediately run a test to ensure that the definition produces the expected results
- F22** – Delete the existing Description Definition from the Table ID



**3.3.4 Table Object Reference Listing**

MDCTBLR					MD Dev	5.06.17	
SCRN1	Table Reference Definitions					11:30:26	
Appl	Lvl	Table ID	Description		File	Library	
MD	12	OPEN	MDOpen Functions		MDDRFUN	MDREPT8	
Type options, press Enter.							
2=Edit 3=Copy 4=Delete 5=Display							
Opt	Def	File	Library	Reference Object	Reference Library	Reference Obj Type	
-	1	MDDRFUN	MDREPT8	MDPGM	"*LIBL"	"*PGM"	
							Bottom
F3=Exit		F5=Refresh		F6=Add			

This screen displays the current list of Table Object Reference definitions. It is accessed by option R for a Table ID.

Object Reference definitions provide a way to create references in MDXREF between Soft Components (Table Objects) and actual Library Objects or other Soft Components.

If a resulting Reference Object Type is \*FILE, it will be shown in MDXREF as a file used by the Table Object. If the Type is anything else, it will be shown in MDXREF as being called by the Table Object.

**Opt**

2	Edit a Table Reference definition
3	Create a new Table Reference definition based on the values of the selected definition.
4	Delete a Table Reference definition
5	Display a Table Reference definition

**Function Keys:**

**F5** – Refresh the list

**F6** – Add a new Table Object definition



**3.3.5 Table Object Reference Definition Detail**

```

MDCTBLR                                MD Dev                                5.06.17
SCRN2                                  Edit Table Reference Definition        11:31:29

Appl: MD      Lvl: 12  Table ID: OPEN                                Def: 1

File . . . . MDDRFUN          *CONSTANT = 1 Object with fixed Name
Library . . . MDREPT8

Ref Obj Name. MDPGM
-----
Ref Obj Lib .  "*LIBL"
Ref Obj Type.  "*PGM"
Join Field . .
-----
Join Target .  _  J=Object Join Field, N=Object Name Field

Condition . .
-----
-----
-----

Enter=Confirm  F4=Browse  F8=Test Definition  F12=Previous

```

This screen contains the parameters to generate references of each object for a Table ID.

**File**

The File name and Library of the Table that contains the Object references

\*CONSTANT – a single object is referenced for each table object with a fixed name, library and type defined as constants (without quotes) in the reference fields.

**Ref Obj Name**

The SQL syntax to generate the names of the referenced objects for the table definition.

**Ref Obj Lib**

The SQL syntax to generate the names of the referenced objects for the table definition.

\*CMD – the Ref Obj Name result contains a command string. In this case, MDXREF will parse the command string to extract the object name, library and type.

**Ref Obj Type**

The SQL syntax to generate the types of the referenced objects for the table definition.

This field should be blank if the Ref Obj Lib is \*CMD.

**Join Field**

The SQL Result column used to join the definition to the file containing the Object definition

**Join Target**

J – The join field for the Reference definition is joined to the join field for the Object definition

N – The join field for the Reference definition is joined to the Object Name field for the Object definition



**Condition**

A valid SQL condition (without the WHERE clause) can be defined to limit the records in the file to those matching the condition.

**Function Keys:**

**F4** – Browse list of valid values for a field

**F8** – immediately run a test to ensure that the definition produces the expected results







### 3.5 XREFBLDLIB – Update Xref Info for a Level or Library API

If objects for an Application Level, or an individual Library in the Level, are being modified outside of MDCMS, then this API can be built into the modification process or scheduling tool to keep the information for objects up-to-date.

#### XREFBLDLIB Parameters

APL	MDXREF Application *ALL – All applications
LVL	MDXREF Level *A – All levels
LIB	Library to update in MDXREF A specific Library *ALL - all libraries defined for Level *TABLE – all table definitions for Level
REORG	Reorganize Data upon completion *NO – not reorganized (recommended) *YES – reorganized – should only be selected if no one is using MDXREF at the time of the process
ENV	The Instance ID of MDXREF for the setting of the library list of the update job. Leave blank for the default instance.

### 3.6 XREFRMVLIB – Remove Xref Info for a Library API

This command can be used to remove a library and its Cross-Reference information from MDXREF, when such removal should happen automatically from within a process.

#### XREFRMVLIB Parameters

APL	MDXREF Application
LVL	MDXREF Level
LIB	Library defined for Level
REORG	Reorganize Data upon completion *NO – not reorganized *YES – reorganized – should only be selected if no one is using MDXREF at the time of the process (recommended)
ENV	The Instance ID of MDXREF for the setting of the library list of the update job. Leave blank for the default instance.



### 3.7 MDXUPDOBJ – Update Xref Info for an Object API

If individual objects are being modified outside of MDCMS, then this API can be built into the modification process to keep the information for objects up-to-date.

#### MDXUPDOBJ Parameters

LIB	Object Library Name or *LIBL to get library name from current list
OBJ	Object Name
TYP	Object Type
ENV	The Instance ID of MDXREF for the setting of the library list of the update job. Leave blank or *DFT for the default instance.

### 3.8 MDXUPDSRC – Update Xref Info for Source API

If source members are being modified outside of MDCMS, then this API can be built into the modification process to keep the information for source members up-to-date.

#### MDXUPDSRC Parameters

LIB	Source Library Name
FILE	Source File Name
MBR	Source Member or *ALL to refresh MDXREF for all members in the source file
ENV	The Instance ID of MDXREF for the setting of the library list of the update job. Leave blank or *DFT for the default instance.



## 4 Using the MDXREF Navigation screens

MDXREF is invoked by typing MDXREF at a command line and pressing Enter. It may also be invoked from the MDCMS main menu if that product was included with MDXREF.

### 4.1 Object/Source Search Display

```

MDC2KXF                                COMPANY NAME                                14.04.21
SCRN1                                  MDXREF Object/Source Search                    10:37:00

Type choices, press Enter.

Object:
Name . . . . . *ALL                        *ALL, name, *gen*eric*
Library . . . . *ALL                        *ALL, library, *gen*eric*
Type . . . . . *ALL                        *ALL, *ILEPRC, *SOURCE, type
Attribute . . . *ALL                        *ALL, attribute, *gen*eric*
Description . . *ALL                        *ALL, *gen*eric*

SQL:
Name . . . . . *ALL                        *ALL, name, *gen*eric*
Type . . . . . *ALL                        *ALL, *NONE, type

Application . . . *ALL                        *ALL, Appl
Level . . . . . _____                Level
1st in Libl Only . N                        Y/N

F3=Exit          F4=Browse          F6=Messages          F8=Submitted Jobs
F9=Build Database F10=Reports         F11=View Output     F21=Sys Command
  
```

This is the first screen that is always seen when you begin MDXREF. Pressing Enter with the defaults in place will result in the display of all objects in the MDXREF database. Otherwise, change the value of one or more of the entry fields to limit the display.

When the user re-enters the MDXREF display, the prior search criteria is reused.

**Building the MDXREF database:** Before objects will be available to list, the desired object libraries will need to be added to the MDXREF database. Also, the existing database may be rebuilt at any time. This is recommended if any objects are manually added, changed, or deleted within a library that is included in the database. If MDCMS is used in order to handle object changes, the MDXREF database is automatically updated as changes occur. **Press F9 to build or rebuild the MDXREF database.** See the section *Building the MDXREF Database* for further help with this process.

#### Entry fields on the initial Search Screen

##### Object Name

The object listing may be filtered to show only objects with a specific system name or, with the use of the wildcard value '\*', objects matching a given pattern.

##### Object Library

The object listing may be filtered to show only objects located in a specific library or, with the use of the wildcard value '\*', objects located in libraries matching a given pattern.



### **Object Type**

The object listing may be filtered to show only objects of a specific type. Press F4 to view a list of all object types found within the MDXREF database.

\*ILEPRC – use this value to view the list of ILE Procedures (procedures imported or exported by ILE modules or service programs) matching the search criteria instead of listing objects.

\*SOURCE – use this value to view the list of source members matching the search criteria instead of listing objects.

### **Object Attribute**

The object listing may be filtered to show only objects of a specific attribute or, with the use of the wildcard value '\*', objects with attributes matching a given pattern. Press F4 to view a list of all object attributes found within the MDXREF database.

### **Object Description**

The object listing may be filtered to show only objects with a specific description or, with the use of the wildcard value '\*', objects with a description matching a given pattern. The search for object descriptions is not case sensitive.

### **SQL Name**

The object listing may be filtered to show only objects with a specific SQL name or, with the use of the wildcard value '\*', SQL names matching a given pattern.

### **SQL Type**

The object listing may be filtered to show only objects of a specific SQL type. Press F4 to view a list of all SQL types found within the MDXREF database.

\*NONE – use this value to view only objects that are not created by SQL statements.

### **Application**

The listings may be filtered to show only the object libraries pertaining to a specific application.

### **Level**

The listings may be filtered to show only the object libraries pertaining to a specific level. A blank value indicates all levels will be considered.

### **1<sup>st</sup> in Libl Only**

N – every occurrence of an object/type combination, or every occurrence of a source name/source member combination, will be listed.

Y – only the first occurrence of an object/type combination, or the first occurrence of a source name/source member combination, will be listed. The order of occurrences is based on the sort sequence of the library list for the application level.

The value of Y is only permitted when a distinct application and level value is entered in the filters.

## **4.1.1 Function Keys specific to Screen 1**

**F9** – Build or rebuild the MDXREF database for one or more applications.

See the *Building the MDXREF Database* section on page 5 for more details.

**F10** – Reports. A menu is displayed which provides access to various analysis reports.  
See the *Report Menu* section for more details.



**4.2 Object Listing**

MDC2KXF	COMPANY NAME				21.04.13
SCRN2	Object Listing				18:06:51
All Applications					
pos _____					
Opt	Obj Name	Type	Library	Attribute	Description
	ADDSHARE	*CMD	QGPL	CMD	Add Share for Folder
	ADDSHARE	*PGM	QGPL	CBL	Shared Folder Maintenance
	ADM	*JOB	QGPL	JOB	Admin Prod
	ADMIN	*CMD	MDADMT8	CMD	Admin command
	ADMIN	*PGM	MDADMT8	CLP	MD Admin
	ADMIND	*FILE	MDADMT8	DSPF	Administration Menu
	ADMT8	*JOB	QGPL	JOB	Admin Test
	BETA70	*JOB	QGPL	JOB	
	BLD10	*JOB	QGPL	JOB	
	BUDEMO	*FILE	QGPL	PF-DTA	list of demo libraries to backup
	BUDEMO	*PGM	QGPL	CLP	Backup Demo Environment to IFS
	BUMM	*CMD	QGPL	CMD	MD: Save libraries to savefiles
	BUMM	*PGM	QGPL	CLP	Backup MMORGAN to IFS
	BUPROD	*FILE	QGPL	PF-DTA	list of prod libraries to backup
	BUPROD	*PGM	QGPL	CLP	Backup Prod Environment to IFS
More...					
F4=Browse    F9=SQL Info    F11=View Output    F15=Print    F21=Sys Command					

This screen displays all objects that match the filters entered in the Search Screen. This list is sorted by Object Name, Object Type and Library. If the listing is for a specific application and level, the library sorting is based on the sort sequence for the library list, otherwise, it is based on the alphanumeric value of the library name.

**pos**

Enter a value at this prompt to position the listing to the first object name that is >= the position value.

**Opt**

Placing a valid value in the option field to the left of an object will result in an analysis display for that object. The possible values available are based on the type and attribute of the object. Press **F4** when the cursor is placed on the Opt field in front of the appropriate object in order to view all possible options for that object.

**F9=SQL Info / Obj Info**

Pressing F9 toggles the view between system information and SQL information. When in SQL mode, the SQL type and SQL name are shown instead of the Object Type and Object Description.

### 4.3 Valid Object Options in MDXREF

The options available for an object differ depending upon the object attribute. To list all options for an attribute, press F4 on the option prompt in front of the object in question.

#### 4.3.1 A – Display the object attributes

Valid for many object types. This option is a shortcut to the IBMi DSPFD, DSPPGM, DSPMOD, DSPSRVPGM, or DSPCMD command.

If the selected object had the library entry of '\*LIBL' and the object exists in more than one library within the cross-reference database, the user is prompted to select the desired library from a list before the object description displayed.

#### 4.3.2 C – List the Copybooks used

Valid for CLP, COBOL and RPG programs (ILE or OPM) and modules if the source for those objects is managed by MDCMS

This option lists all source members that are used as copybooks in the program or module.

#### 4.3.3 C – Compare File Data (for physical files only)

Valid option for physical files only.

This option allows you to view the content differences between 2 file members on a record-by-record and field-by-field level.

When 'C' is entered, the following screen is displayed for entering the file information.

```

MDC2KXF                                COMPANY NAME                                MDXREF
SCRN10                                  MD Data Comparison Report                    10/27/11
                                                                                          12:02:45

      Basis File . . . . . CUSTOMERS
      Library   . . . . . PRODLIB
      Member    . . . . . CUSTOMERS

      Comparison File . . . CUSTOMERS
      Library     . . . . . *LIBL
      Member      . . . . . *FIRST

Enter=Select Fields   F4=Browse   F7=Load Def   F9=Save Def   F11=View Output
  
```



**Basis File**

The basis file and library was selected on the prior screen where the 'C' was entered. If the file has multiple members, a member name may be entered. F4 may be pressed to select a member from the list.

**Comparison File**

Enter the name of the file to compare to. The file structure of the comparison file does not have to be the same as the basis file. If the library is left as \*LIBL, a list of cross-referenced libraries where the file exists will be displayed. If the file has multiple members, a member name may be entered. F4 may be pressed to select a file, library, or file member.

**Function Keys:**

**Enter** – Display the field listing screen based on the files entered for the comparison.

**F4** – Browse the list of valid entries for a field by first placing the cursor on the field.

**F7** – Load the parameters from a saved Comparison Report definition

**F9** – Save the entered parameters as a report definition. The saved definition may then be reused in the future from within MDXREF or from a command line. See the chapter on MDRUNRPT for more information about running reports from a command line.

**F11** – view the results of this comparison or any other MDXREF report

**F12** – Cancel/end comparison analysis.

The following screen is displayed for controlling the sort and selection of records by the comparison job. All fields that have the same name and type (numeric/alphanumeric only) are displayed.

```

MDCCFDC                MD Data Comparison Report                10/27/11
SCRN1                  Field/Record Selection                  12:02:45

Basis File: CUSTOMERS  Comparison File: CUSTOMERS
Library.: PRODLIB      Library.....: TESTLIB
Member....: CUSTOMERS  Member.....: CUSTOMERS

Find Field: _____ F16

Type options, press Enter.
C=Comparison Field  K=Key Field

Opt  Field Name  Len Typ Dec  Description  Minimum  Maximum
K    CPDAR      3  P         Customer ID 1  110      900
K    CPDAL      3  P         Customer ID 2  _____
K    CPDAR      7  P         Customer Ref ID  _____
K    CPDALG     3  P         Customer Type  _____
C    CPDAAR     30  A         Customer Name  B        C
C    CPDAAM     30  A         Customer Address 1  _____
C    CPDAAM     30  A         Customer Address 2  _____
_    CPDAAR     30  A         Customer Address 3  _____
More...

F5=Refresh  F9=Save Def  F11=View Output  F13=Unselect All  F17=Top  F18=Bottom
  
```

**Find Field**

This is used in conjunction with **F16** to find a specific field in the listing.

**Opt**

C – Comparison field. The field's data will be compared and listed when a difference is found.

K – Key field. The field will be used to sort and join the 2 file members. It is best if the fields necessary to make a record unique are selected as Key fields. Up to 50 key fields may be selected.

If the field option is blank, the field will be ignored for key and comparison purposes, but a minimum/maximum may still be entered for the field to limit records.



### **Minimum/Maximum**

The set of records to compare may be limited by entering a range of values for 1 or more fields.

### **Function Keys:**

**Enter** – Submit comparison job to batch. A message will be sent at the end of the job specifying whether or not differences were found. The results of the comparison, if differences are found, will be written to the output file at the very end of the job. The file may be viewed by pressing F11 from any MDXREF screen.

**F3** – Cancel comparison analysis.

**F5** – Refresh the listing. The fields are sorted by key fields, then compare fields, then unused fields.

**F9=Save Def** - Save the entered parameters as a report definition. The saved definition may then be reused in the future from within MDXREF or from a command line. See the chapter on MDRUNRPT for more information about running reports from a command line.

**F11=View Output** – View Output from XREF reports or spooled files.

**F13** – Select/Unselect comparison fields. This is a toggle to set all 'C', or compare, fields to blank or vice-versa.

**F16** - Find Field - If a value is entered in the Find Field prompt, located near the top of the screen, the next field in the list matching that value is displayed. The search for the matching field begins 1 line past where the cursor is currently located. If the cursor is not located in the list, the search starts at the first currently displayed line in the list. '\*' may be used as a wild-card value before and/or after the search string. For example, if the user enters 'P350\*', the search will look for the next field in the list starting with 'P350'. If the user enters '\*P350', the search will look for the next field in the list ending with 'P350'. If the user enters '\*P350\*', the search will look for the next field in the listing containing the string 'P350'. If the search reaches the bottom of the list without a match, it will restart at the top of the list.

**F17** – reposition the cursor to the first field in the list.

**F18** – reposition the cursor to the last field in the list.

### **4.3.4 D – Display the object description**

Valid for all system objects. This option is a shortcut to the IBMi DSPOBJD command.

The most important information that this option displays is:

- when an object was created
- who created the object
- the last time that the object was used
- the # of days that the object has been used

If the selected object had the library entry of '\*LIBL' and the object exists in more than one library within the cross-reference database, the user is prompted to select the desired library from a list before the object description displayed.

### **4.3.5 E – Exported Procedures**

Display the list of all procedures exported by the ILE Module or Service Program

### **4.3.6 F – Full Name**

Table Definition entries and SQL entities can be up to 80 characters in length within MDXREF. Option F can be used in order to display the full name for such components.

### **4.3.7 F – Process Flow Reports**

See that the section titled P – Process Flow Reports below.





**4.3.8 I – Imported Procedures**

Display the list of all procedures imported by the ILE Module.

**4.3.9 J – Journal Analysis report (for Physical files only)**

Valid option for Physical files only.

This option allows you to view the journal records for a physical file in a customizable and easy-to-read format. When 'J' is entered, the following screen is displayed for entering the primary record and journal receiver selection information.

```

MDCJRN2                                COMPANY NAME                                10/27/11
SCRN1                                  MD Journal Analysis Report                        15:02:01

File: PFJOURNAL   Library: PRODLIB   Journal Images: *BOTH

Search Range:           Date       Time
Start . . . . . 10/27/11  150134   Date/Time, *PM *Pn D, *CM, *CD
End   . . . . . 10/27/11  150201

Filters:
User . . . . . *ALL           *ALL, User
Job . . . . . *ALL           *ALL, Job
Program . . . . *ALL         *ALL, Program
Action . . . . . *ALL         *ALL, INSERT, UPDATE, DELETE

Journal . . . . . MYJOURNAL
Library . . . . . MYLIBRARY
From Receiver . . *CURCHAIN       *CURCHAIN, *CURRENT, Receiver
Library . . . . .
To Receiver . . . blank, Receiver
Library . . . . .

F3=Exit   F4=Browse   F7=Load Def   F9=Save Def   F11=View Output
  
```

**Search Range:**

**Start Date/Time**

Enter the start date and time of journal entries to be considered. The default start date/time is either the date/time of the first entry for the selected file, or the creation date/time of the selected file, whichever is younger.

**Special Values**

<b>*CM</b>	The current calendar month
<b>*CD</b>	The current day
<b>*PM</b>	The prior calendar month
<b>*Pn D</b>	n number of days prior to today. Example – enter *P3 to select journal transactions for the prior 3 days

**End Date/Time**

Enter the end date and time of journal entries to be considered. The default end date and time is the current date/time. If a special value is used for the Start Date, then the End Date/Time are not applicable.



**User Filter**

Enter the profile id of a user to limit journal entries to records updated by that user.

**Job Filter**

Enter the name of a job to limit journal entries to records updated by that job.

**Program Filter**

Enter the name of a program to limit journal entries to records updated by that program.

**Action Filter**

Enter INSERT, UPDATE, or DELETE to limit journal entries to records with that action.

**Journal**

The Journal Name and library in which the transactions should be searched. This will default to the currently active journal for the physical file.

**From Receiver**

The starting journal receiver name and library for the Journal

**Special Values**

<b>*CURCHAIN</b>	The currently active chain of receivers for the journal
<b>*CURRENT</b>	The currently attached receiver for the journal

**To Receiver**

The ending journal receiver name and library for the Journal – if a special value is entered for the starting receiver, or only one receiver should be included, leave this blank.

**Function Keys:**

**Enter** – Display the field listing screen based on the file.

**F3/F12** – Cancel journal analysis.

**F4** – Browse the list of valid entries for a field by first placing the cursor on the field. The User and Program fields are enabled for the browse function on this panel.

**F7** – Load the parameters from a saved Journal Analysis Report definition

**F9** – Save the entered parameters as a report definition. The saved definition may then be reused in the future from within MDXREF or from a command line. See the chapter on MDRUNRPT for more information about running reports from a command line.

**F11=View Output** – View Output from XREF reports and spooled files.



The following screen is displayed for controlling the selection of fields and records for the journal analysis report:

```

MDCJRN2                                COMPANY NAME                                10/27/11
SCRN2                                  Journal Report Field/Record Selection          11:32:18

File.....: PARTNER                    Program.: *ALL
Library.: FLSCSCHPF                   User.....: *ALL                               Find Field _____ F16

Type options, press Enter.
1=Select Field

Opt  Field Name   Len Typ Dec  Description                               Value Range, *NOVAL  Mod
      _____  _____  _____  _____  _____  _____  _____  _____
  1  *RRN         10  S      Relative Record number                   _____  _____  N
  1  CPDAR         3  P      Customer ID 1                           110        900        N
  1  CPDAL         3  P      Customer ID 2                           _____  _____  N
  1  CPDAR         7  P      Customer Ref ID                          _____  _____  N
  1  CPDALG        3  P      Customer Type                            *NOVAL     _____  N
  1  CPDAAR        30  A      Customer Name                            B          C          N
  1  CPDAAM        30  A      Customer Address 1                       _____  _____  N
  -  CPDAAR        30  A      Customer Address 3                       _____  _____  N
                                                                                               More ...

F5=Refresh   F9=Save Def   F11=Output   F13=Select All   F17=Top   F18=Bottom
  
```

**Find Field**

This is used in conjunction with **F16** to find a specific field in the listing.

**Opt**

1 – Select Field. Display the field as a column in the journal analysis report. Even If the field is not selected, the Value Range and Mod Req criteria can be used for the field.

**Value Range**

The transactions to include may be limited by entering a range of values for 1 or more fields. A blank entry for Minimum means there is no minimum and a blank entry for Maximum means there is no maximum. If transactions should be selected for a specific value, enter it in the minimum and maximum fields.

**Special Values**

<b>*NOVAL</b>	transactions should only be selected when the value is empty (spaces for alphanumeric fields or zeroes for numeric fields)
---------------	--

The transactions must fit within the range for ALL fields in order to be included in the list (AND condition).



**Mod Req**

Include a transaction only if it modified a field's value

**Values**

<b>N</b>	not required that the field's value was modified by the transaction
<b>Y</b>	the field's value must have been modified by the transaction from any value to any other value
<b>F</b>	the field's value must have been modified from a value within the entered Value Range to a value outside of the entered Value Range
<b>T</b>	the field's value must have been modified from a value outside of the entered Value Range to a value within the entered Value Range

If this flag is used for 2 or more fields, a transaction must have modified a minimum of 1 of those fields in order to be included in the list (OR condition).

**Function Keys:**

**Enter** – Submit job to batch. A message will be sent at the end of the job specifying whether or not journal entries were found. The journal entries will be written to the output file at the very end of the job.

**F3/F12** – return to entry selection screen.

**F5** – Refresh the listing. The fields are sorted by selected fields, then non-selected fields in record format order.

**F9=Save Def** – Save the entered parameters as a report definition. The saved definition may then be reused in the future from within MDXREF or from a command line. See the chapter on MDRUNRPT for more information about running reports from a command line.

**F11** = Output - View Output or spooled files.

**F13** – Select/Unselect fields. This is a toggle to set all '1', or selected, fields to blank or vice-versa.

**F16** - Find Field - If a value is entered in the Find Field prompt, located near the top of the screen, the next field in the list matching that value is displayed. The search for the matching field begins 1 line past where the cursor is currently located. If the cursor is not located in the list, the search starts at the first currently displayed line in the list. '\*' may be used as a wild-card value before and/or after the search string. For example, if the user enters 'P350\*', the search will look for the next field in the list starting with 'P350'. If the user enters '\*P350', the search will look for the next field in the list ending with 'P350'. If the user enters '\*P350\*', the search will look for the next field in the listing containing the string 'P350'. If the search reaches the bottom of the list without a match, it will restart at the top of the list.

**F17** – reposition the cursor to the first field in the list.

**F18** – reposition the cursor to the last field in the list.



### 4.3.10 L – Linked Objects / Linked Files

Valid option for files, modules, programs and service programs only.

This option provides a direct method of indicating when files are used or linked by another object when that reference isn't automatically known by MDXREF.

Examples of use:

- Link a primary file with all other files that need to be considered when the primary file changes, due to a shared record format.
- Link a module to a file that is used via dynamic SQL

When there are substantial numbers of instances where MDXREF isn't automatically aware of references, and the updates to such references should happen whenever changes occur, then Table Definitions can be used instead to manage the references.

However, using option L is much quicker and easier to configure a small number of such references.

When 'L' is entered, the following screen is displayed for entering linked information between files and objects.

```

MDCOLNK                MD T 8.1 dev                16.11.17
SCRN1                   Manually Linked Objects    11:12:31
Filters
File . . . MDAPAR      Object . . _____      Object Type . _____
Library . TEST80_10    Library . _____

Type options, press Enter.
2=Edit 3=Copy 4=Delete 5=View

Opt File      Library  Objects
_ MDAPAR     TEST80_10  ADDSHARE, ADM, CHARTAB

F3=Exit  F5=Refresh  F6=Add

Bottom

```

This screen lists the existing linked object definitions based on the filters at the top of the screen. The file/library filter is pre-filled when option L is entered for a file and the Object/Type filter is pre-filled when option L is entered for a module, program or service program.

The filter values can be removed or modified to adjust the listing.

Press F6 to add a new file to be linked to a number of objects, or use options 2-5 to manage existing links.

When adding a file, you will first be prompted for the name of the file and the file library. If the file is qualified for a specific library, it must exist to be stored. If \*LIBL is used for the library, then the file can be any name.

After the entry of the file, a list of object names, libraries and types can be entered that should be linked to the file.



**4.3.11 M – ILE Modules bound by a Program or Service Program**

Valid for programs and service programs.

This option lists all modules that are bound by the program. The PEP flag designates which module contains the Program Entry Procedure (PEP) for the program.

**4.3.12 P – All Relational Dependencies Report**

Valid option for files only.

This option will result in a formatted report listing all files, programs, queries, etc... that use the file. In addition, if a file uses the base file, all files, programs, queries, etc... are also included for that file.

For example, option 'P' is entered for physical file ORDERS. There are 5 logical files over this physical file along with 48 programs and 10 queries that use this physical file. Additionally, there are 120 programs that use one or more of the logical files. All of these dependencies would be included in the report.

When 'P' is entered, the following screen is displayed for entering report filters.

```

MDC2KXF                                COMPANY NAME                                MDXREF
SCRN6                                  MD All Relational Dependencies Report      10/27/11
                                         All Applications                            12:02:45

Library: BT
Object.: ORDERS

Filter Dependencies by
Library....: _____ Name, Generic*
Name.....: _____ Name, Generic*
Attribute..: _____
Object Type: _____
Usage.....: _____

Enter=Confirm  F4=Browse  F11=View Output  F12=Previous

```

**Filter Dependencies by:**

**Library**

The report may be filtered to show only objects in a specific library or, with the use of '\*', libraries beginning with a specific character string.

**Name**

The report may be filtered to show only a specific object or, with the use of '\*', objects beginning with a specific character string.

**Attribute**

The report may be filtered to show only objects with a specific attribute. For example, enter RPG to show only RPG programs.



**Object Type**

The report may be filtered to show only objects of a specific type. For example, enter \*PGM to show only programs.

**Usage**

The report may be filtered to show only objects that use a file in a certain way. For example, enter I/O to show only objects that read and write to a file.

**4.3.13 P – Process Flow Reports**

Valid option for menus, commands, functions, materialized query tables, modules, procedures, programs, scheduled jobs, table objects and views.

When 'P' is entered, the following screen is displayed for specifying reporting choices:

MDC2KXF	COMPANY NAME	MDXREF
SCRN7	MD Process Flow Reports	10/27/13
	All Environments	12:05:38
Starting Object Name . . . . .	MDCDATR	
Starting Object Library . . . . .	MDBUILD	
Starting Object Type . . . . .	*MODULE	
Generate Process Flow Report . . . . .	—	Y/N
Generate Object Catalog . . . . .	—	Y/N
Generate File Usage Report . . . . .	—	Y/N
Object Filter Definition . . . . .	_____	definition
Maximum Call Stack Depth . . . . .	<u>52</u>	1-256
File Usage Report Filters:		
File Name . . . . .	_____	name, generic*
File Attribute . . . . .	_____	attribute
File Usage . . . . .	_____	usage
File Filter Definition . . . . .	_____	definition
Enter=Confirm	F4=Browse	F11=View Output F12=Previous

**4.3.13.1 Generate Process Flow Report**

Create a report that shows each distinct call stack possible from the initial object. Each column in the report represents the depth of the object in that stack, meaning that the object in column 1 is called by the initial object and it then calls the object in column 2 which calls the object in column 3, etc.

If an object in the stack had previously been listed in the report, and that object calls other objects, it will be listed with \*REPEAT as the value in the proceeding column.

**4.3.13.2 Generate Object Catalog**

Create a report that alphabetically lists every object invoked in the Process Flow Report. In addition to the name of the object, the library, type, attribute, description, create date, create time, source change date and source change time are also listed.



#### **4.3.13.3          Generate File Usage Report**

Create a report that alphabetically lists every file that is used within the process flow as well as which objects use the file and how the file is used.

#### **4.3.13.4          Object Filter Definition**

A filter definition can be selected in order to omit certain libraries or objects from the Process Flow reports. Press F4 to create, modify or select a Filter Definition.

#### **4.3.13.5          Maximum Call Stack Depth**

The depth of the reported stack can be limited to between 1 and 256 columns

#### **4.3.13.6          File Usage Report Filters**

The File Usage Report can be further filtered by the following parameters:

##### **File Name**

The report may be filtered to show only a specific file or, with the use of '\*', files beginning with a specific character string.

##### **File Attribute**

The report may be filtered to show only files with a specific attribute. For example, enter LF to show only logical files.

##### **File Usage**

The report may be filtered to show only objects that use a file in a certain way. For example, enter I/O to show only objects that read and write to a file.

##### **File Filter Definition**

A filter definition can be selected in order to omit certain libraries or files from the Usage report. Press F4 to create, modify or select a Filter Definition.

#### **4.3.14          Q – Query the contents of a file or data area**

Valid for physical, logical, and message files as well as for data areas.

For data files, this option is a shortcut to the IBMi RUNQRY command with record selection ability turned on. The user may simply press enter from the record selection screen to see all records in the file, or the user may enter conditions in order to limit the records that are displayed. Press F1 from the record selection screen to view the IBM help topics for RUNQRY.

If the selected file had the library entry of '\*LIBL' and the file exists in more than one library within the cross-reference database, the user is prompted to select the desired library from a list before the query screen is displayed.

If the selected file has more than 1 member, the user is prompted to select the desired member from a list before the query screen is displayed.

For message files, this option is a shortcut to the WRKMSGF command in display-only mode.





#### **4.3.15 S – View the source member from which the object was compiled**

Valid for programs, modules, files, SQL elements, queries, and commands. MDXREF starts an SEU or IFS session in view-only format.

MDXREF determines the name and location of the source based on the following conditions in the order listed:

- 1) For \*QMQRV or \*QRYDFN objects, the source is retrieved from the query object
- 2) The location of the last installation of the source for the object in MDCMS, if MDCMS is used
- 3) The MDCMS location of the source for the object, according to the attribute definition, if MDCMS is used
- 4) The location the source was found in the last time that someone used option S for the Library/Object/Type combination.
- 5) The source location according to the object description
- 6) The source member with the same name of the object in the first found library based on the library sort sequence for the applications(s) and level(s) that the object library belongs to.

If the source wasn't found, then the user is prompted for the location of the source.

#### **4.3.16 S – View a source member contained in a source file**

Valid for files with attribute PF-SRC. MDXREF starts an SEU session in view-only format.

If 'S' is entered in front of a source file, MDXREF will list all members contained within the source file. The list can be generically filtered by name or description. Enter a 1 in front of a member to view the source code for that member.

#### **4.3.17 V – Service Information**

This option displays object service information formatted to reflect Object Stamping information applied during the installation of an object in MDCMS. F9 can be pressed to change the display to the standard IBM \*SERVICE screen.

#### **4.3.18 X – XREF Refresh for Object**

Valid for all objects.

If an object has been manually changed or deleted since the last build of the MDXREF application database, the object's MDXREF information may be refreshed by using option 'X'.

If the selected object had the library entry of '\*LIBL' and the object exists in more than one library within the cross-reference database, the user is prompted to select the desired library from a list before the object's information is refreshed.



**4.3.19 1 – Display list of Objects using File or Module**

Valid option for Files or ILE Modules only.

This option will display a list of all objects that use the specific file as well as how the file is used by the object. Alternatively, this display will list all programs or service programs that use a specific ILE module. The following is an example of option 1.

```

MDC2KXF                MD T 8 6.1                26.01.17
SCRN3                   Objects Using File         14:22:01
                        Appl: TEST Lvl: 10
Library.: TEST80_10    Filter by Name: _____ Type: _____
File Name: MDAPAR      Library: _____ Attr: _____
                        Description: _____ Usage: _____

pos
Opt Obj Name  Type  Library  Attribute  USG Description
--  --  --  --  --  --
_   MDA003    *PGM  TEST80_50 CBL        I/O Admin: Partners
_   MDA005    *PGM  TEST80_50 CBL        INP Admin: Profit Distribution Par
_   MDA006    *PGM  TEST80_50 CBLLE     INP Admin: Invoices
_   MDA007    *PGM  TEST80_50 CBL        INP Admin: Invoice Partner Profits
_   MDA008    *PGM  TEST80_50 CBLLE     INP Admin: Payments
_   MDA009    *PGM  TEST80_50 CBLLE     INP Admin: Transfers
_   MDA010    *PGM  TEST80_50 CBLLE     INP Admin: Balances
_   MDA011    *PGM  TEST80_50 CBLLE     INP Admin: Credits
_   MDA012    *PGM  TEST80_50 CBL        INP Admin: Earnings
_   MDA016    *PGM  TEST80_50 CBL        INP Admin: Annual Maint Forecast

Bottom
F4=Browse  F11=View Output  F9=SQL Info  F15=Print  F21=Sys Command

```

The listed referenced objects are sorted by Object Name, Object Type and Library. If the listing is for a specific application and level, the library sorting is based on the sort sequence for the library list, otherwise, it is based on the alphanumeric value of the library name.

If the parameter “1<sup>st</sup> in Libl Only” on the initial screen is set to Y, then only the first occurrence of an Object Name/Type combination will be listed.

If a specific application and level was specified on the initial screen, then any reference for library value \*LIBL will be replaced by the first found library for the Object Name/Type combination.

**Filter by Name**

Enter part or all of an object name to filter the list to objects containing the entered value somewhere within the name.

**Filter by Type**

Enter an object type in this field to view only objects with the entered type. For example, enter \*PGM here to view only program types.

If in SQL Info mode, then enter one of the valid SQL types (\*SQLALS, \*SQLCST, \*SQLFUN, \*SQLIDX, \*SQLMQT, \*SQLPRC, \*SQLSEQ, \*SQLTAB, \*SQLTRG, \*SQLVAR or \*SQLVW).

**Filter by Library**

Enter part or all of a library name to filter the list to objects containing the entered value somewhere within the library name.



**Filter by Attribute**

Enter part or all of an object attribute to filter the list to objects containing the entered value somewhere within the attribute.

**Filter by Description**

Enter part or all of an object description to filter the list to objects containing the entered value somewhere within the description.

**Filter by SQL Name**

If in SQL Info mode, then enter part or all of an SQL long name for an object to filter the list to objects containing the entered value somewhere within the SQL long name.

**Filter by Usage**

Enter a usage value (from the list below) in this field to view only objects with the entered usage. For example, enter DBR here to view only logical files over a specific physical file.

**pos**

Enter a value at this prompt to position the listing to the first object name that is >= the position value.

**Usage List**

- CHG – A file format is altered.
- CPY – The contents of a file are copied to another file.
- CRT – A file is created.
- CST – A constraint applied to the file
- DBR – Database Relation such as Logical file over Physical file or View over View
- DDS – A file format is copied into the source for a program
- DEL – A file is deleted
- HST – A file is a History Table for a linked Temporal Table
- INP – An object uses a file for input only.
- I/O – A program uses a file for input and output.
- OUT – A program uses a file for output only.
- OVR – A file is overridden to another file.
- REF – A printer or display file contains field(s) that reference field(s) in the file.
- SPC – A file is used within a CL program by a FMTDTA or OPNQRYF command or used in a program in embedded SQL statements.
- TRG – A trigger applied to the file or program invoked by the trigger

**Option**

All options that are available from the Object browse screen are also available from this screen. In principle, a person may continue running MDXREF options 1 – 4 until they hit the end of their application.



#### **4.3.20      2 – Display list of Files used by Object**

Valid for many types of objects

This option will display a list of all files that are used by the specific object as well as how the file is used.

Everything in Option 1 applies to Option 2. See the section for option 1 for more details.

#### **4.3.21      3 – Display list of Objects calling selected Object**

Valid for many types of objects

This option will display a list of all objects that call or somehow invoke the selected object.

For example, if a '3' was entered in front of program JORDCB1, a list would be displayed showing all programs that call JORDCB1, all commands that invoke JORDCB1, or all menus that JORDCB1 is called from.

Everything in Option 1 applies to Option 3 (except usage). See the section for option 1 for more details.

SQL object types \*SQLFUN and \*SQLPRC can be the called object types used by calling object types \*SQLFUN and \*SQLPRC.

#### **4.3.22      4 – Display list of Objects called**

Valid for many types of objects

This option will display a list of all objects that are called by the selected object.

For example, if a '4' was entered in front of program JORDCB1, a list would be displayed showing all programs that JORDCB1 calls, all user commands that JORDCB1 invokes, all menus that JORDCB1 starts, or all queries that JORDCB1 runs.

Everything in Option 1 applies to Option 4 (except usage). See the section for option 1 for more details.

Additionally, for menus, the option number of the first occurrence of a called object is displayed.

For ROBOT jobs, the command sequence number of the first occurrence of a called object is displayed.

SQL object types \*SQLMQT, \*SQLVW, \*SQLFUN and \*SQLPRC can be the calling object types of object types \*SQLFUN and \*SQLPRC.



**4.3.23 5 – Display list of Fields in File**

Valid option for physical and logical files only

This option will display a list of all fields and their attributes for a file. If the selected file had the library entry of '\*LIBL' and the file exists in more than one library within the cross-reference database, the user is prompted to select the desired library from a list before the fields are displayed.

The list is initially sorted by field position, but may be sorted by field name by pressing **F8**. The following is an example of the Field display.

```

MDC2KXF                COMPANY NAME                MDXREF
SCRN4                   Fields in File              10/27/16
                                                            10:37:00

Library.: MDCMST8                Start Pos.: _____
File Name: MDDCMSD              Description: _____

Type options, press Enter.
  1=Source containing Field

Opt Field Name      Len  Typ Dec   Pos  Description      Format
-  MDREQN           11   P      1    Request Number   RDDCMSSD
-  MDAGP             6   A      7    Application      RDDCMSSD
-  MDLVL            3   P     13    Level            RDDCMSSD
-  MDRFP            7   P     15    RFP Number       RDDCMSSD
-  MDCSQ            2   P     19    Compile Seq      RDDCMSSD
-  MDCSQO           5   P     21    Compile SubSeq   RDDCMSSD
-  MDUSER           10  A     24    User             RDDCMSSD
-  MDOBJN          128 V A    34    Object           RDDCMSSD
-  MDOBJT           7   A    164    Object Type      RDDCMSSD
-  MDOBJA           10  A    171    Object Attribute  RDDCMSSD
-  MDRSN            1   A    181    Reason          RDDCMSSD
More...

F8=Sort by Pos  F9=SQL Name  F11=View Output  F15=Print  F21=Sys Command

```

**Start Pos/Pos to Field**

Enter a value at this prompt to restart the listing at a new point based on the sort column

**Description Filter**

Entering a text string at this prompt will result in a listing of all fields with a description containing the text string. For example, enter ASSET to see all fields with asset somewhere in the description. The search is not case sensitive.

**Opt**

1 – Source containing Field – this option causes MDXREF to collect the source for all objects either directly using the file or a logical over the file, along with all copybooks used by dependent programs. It then inspects the code for any non-commented lines containing the field and then presents the results.

**Len**

The usable length of the field. This value is the number of digits or characters, not bytes. If the field has a variable length, a V will be included for the column

**Typ**

The type of field. Common types: A = alphanumeric; P = packed numeric; S = zoned numeric

**Pos**

The byte # in a file record where the field begins.

**Dec**

The number of decimal places after the '.' for numeric fields.

**Function Key:**

**F8** - toggle the sorting of the field list between name sort and starting position sort

**F9** - toggle between the display of the field description and the SQL Name for the field

**4.3.24 6 – Display Key Structure/Selection Rules for File**

Valid option for physical and logical files only.

This option will display the list of field keys and their attributes for a file.

For physical files/tables, a field will be listed as a key if it is part of the primary key constraint, unique key constraint or the access path of the physical file.

For logical files, all select/omit rules will also be listed.

If the selected file had the library entry of '\*LIBL' and the file exists in more than one library within the cross-reference database, the user is prompted to select the desired library from a list before the fields are displayed.

The key structure listing is sorted by the key order in the file's access path and is displayed in the color **green**. Any select/omit rules follow the key structure and are displayed in the color **yellow**. The following is an example of the Key Structure/Selection Rules display.

```

MDC2KXF                COMPANY NAME                MDXREF
SCRN4                   Keys/Selections for File    10/27/11
                                                10:37:02

Library.: ACCTLIB      Unique: N
File Name: ASSETF

Type options, press Enter.
  1=Source containing Field

Field Name      Len Typ Dec   Pos   Description          Sort/Rule
ABANUM         11  A   4     Asset number          ASCENDING
ABANSR          3  P   15    Asset sequence number  DESCENDING
ABCSTD          5  A   31    '018'                SELECT EQ

                                                Bottom

F9=SQL Name  F11=View Output  F15=Print  F21=Sys Command
  
```

**Unique**

MDXREF lists whether or not the key structure for the file is defined as being UNIQUE. If a structure is unique, only 1 record in the file may exist for each distinct set of key values.

**Opt**

**1 – Source containing Field** – this option causes MDXREF to collect the source for all objects either directly using the file or a logical over the file, along with all copybooks used by dependent programs. It then inspects the code for any non-commented lines containing the field and then presents the results.



**Len**

The usable length of the field. This value is the number of digits or characters, not bytes. If the field has a variable length, a V will be included for the column

**Typ**

The type of field. Common types: A = alphanumeric; P = packed numeric; S = numeric

**Start Pos**

The byte # in a file record where the field begins.

**Sort/Rule**

ASCENDING – The key is sorted in ascending order for the access path

CONSTRAINT – The key is part of a Primary Key or Unique Key constraint

DESCENDING – The key is sorted in descending order for the access path

SELECT EQ – select records where field equals value in Description. This may also be an OMIT GT, etc... See the IBMi documentation for a full list of possible selection rules.

**Function Key:**

**F9** - toggle between the display of the field description and the SQL Name for the field



**4.3.25 7 – Display Join Field Information for File**

Valid option for logical files only.

This option will display the list of join fields and duplicate sequencing fields for a join file.

If the selected file had the library entry of '\*LIBL' and the file exists in more than one library within the cross-reference database, the user is prompted to select the desired library from a list before the fields are displayed.

The listing is sorted in the same order that the join fields were defined. Fields used to order duplicate records are designated with the To Field name \*DUPSEQ.

The following is an example of the Key Structure/Selection Rules display.

```

MDC2KXF                COMPANY NAME                MDXREF
SCRN12                  Join Fields for File         11/27/11
                                                                10:37:00

Library.: ACCTLIB
File Name: ASSETF3      Asset file for join

  From Field  File      Library      To Field  File      Library
  OSOBNR     ASSETF    ACCTLIB     OFOBNR   CUSTOMERF ACCTLIB
  OSOBLF     ASSETF    ACCTLIB     OFOBLF   CUSTOMERF ACCTLIB
  OFTYP      ASSETF    ACCTLIB     *DUPSEQ

F11=View Output      F12=Previous      F15=Print      F21=Sys Command

                                                                Bottom
  
```

**From Field/File/Library**

One side of the join of 2 physical files.

**To Field/File/Library**

The other side of the join of 2 physical files. If the To Field specifies \*DUPSEQ, then the From Field is used to sort duplicate records in the join file.

**4.3.26 9 – Display CPYF/OVRDBF Information for File**

Valid option for files only.

This option will display the list of all CL programs or robot commands that perform an override or a CPYF from the selected file to another file. CL programs will only be listed if the source is specified as Observable.





**4.4 Source Listing**

```

MDCXRFS                                COMPANY NAME                                21.04.13
SCRN1                                  Source Member Listing                            18:33:40
      Position To                          All Applications                                Filter By
Member: _____                               File: _____
                                                Content: _____

Type options, press Enter.
C=Compare  D=Description  P=Programs using Source  S=View Source

Opt Member  File      Library  Attribute  Description
-  MDA001   MACBL    MDSRCP74  CBL        Admin: Customers
-  MDA001   QCBLSRC  MDADMT8  CBL        Admin: Customers
-  MDA001D  MADDS    MDSRCP74  DSPF       Admin: Customers
-  MDA001D  QDDSSRC  MDADMT8  DSPF       Admin: Customers
-  MDA002   MACBL    MDSRCP73  CBLLE     Admin: Customer Licenses
-  MDA002   QCBLSRC  MDADMT8  CBLLE     Admin: Customer Licenses
-  MDA002D  MADDS    MDSRCP73  DSPF       Admin: Customer Licenses
-  MDA002D  QDDSSRC  MDADMT8  DSPF       Admin: Customer Licenses
-  MDA003   MACBL    MDSRCP72  CBL        Admin: Partners
-  MDA003   QCBLSRC  MDADMT8  CBL        Admin: Partners
-  MDA003D  MADDS    MDSRCP72  DSPF       Admin: Partners
-  MDA003D  QDDSSRC  MDADMT8  DSPF       Admin: Partners
                                                More...

F4=Browse  F11=View Output  F12=Previous  F15=Print  F21=Sys Command
  
```

This screen displays all source members that match the filters entered in the Search Screen. The Type in the Search Screen must be \*SOURCE. This list is sorted by Member Name.

**Position to Member**

Enter a value at this prompt to restart the listing at a new point.

**Filter By File**

Enter the name of a source file here to further limit the list to source members residing in the file

**Filter By Content**

Enter a string to be searched for within the source members. The string is not case sensitive and may occur anywhere within the member's code.

Warning – it can take a long time to process the search if the list of members that meet all other filter criteria is large. A status message is displayed to show the progress of the search.



**4.5 Valid Source Options in MDXREF**

The options available for an object differ depending upon the object attribute. To list all options for an attribute, press F4 on the option prompt in front of the object in question.

**4.5.1 C – Compare Source Members**

Compare the contents of one source member to the contents of a second source member  
Place option C in front of one source member and press Enter. The following screen will prompt for the second source member:

```

MDCXRFS                                COMPANY NAME                21.04.13
SCRN2                                   Compare Source Members     18:37:40

Source File . . . . QCPYSRC
Library . . . . . MDSECT
Member . . . . . EXAMPCLP

                                Compare With

Location . . . . . *LOCAL
Source File . . . . QCPYSRC
Library . . . . . MDSECT
Member . . . . . EXAMPCLP

F4=Browse   F11=View Output   F12=Previous   F21=Sys Command

```

**Location**

\*LOCAL indicates that the source file is located on the current system. Otherwise the location is a network address defined in the MDCMS Synchronization Settings. Press F4 to select the location from a list.

**Source File**

The name and library of the source file containing the other source member. Press F4 to select from a list

**Member**

The name of the source member to compare with

If there are differences between the members, the differences will be shown in parallel in a split screen. Press F16 to forward through the source to the next difference and F3 to exit the comparison results screen.



#### **4.5.2 D – Source Member Description**

Details pertaining to the source member, including the Attribute, Text, Creation date/time and Change date/time.

#### **4.5.3 P – Programs using Source**

List all programs or modules that use the source as a copybook

The primary source for those objects must be managed by MDCMS for MDXREF to be aware of the copybook references.

The primary source used to compile the object is not considered a copybook and is not listed on this screen.

#### **4.5.4 S – View Contents of Source Member**

View the source member in SEU

## 5 Report Menu

The report menu is accessed by pressing **F10=Reports** on the Cross-Reference Display (MDC2KXF/SCRN1). The menu gives the user access to various analysis reports that are not necessarily relevant to a specific object. A description of each report is listed below.

### 5.1 Object Library Comparison

Function: To compare the objects in one library to the objects in another library.

The following object differences are listed in the Object Comparison Report:

- Object existence
- Object Attribute
- Object Description
- Files used by the object as well as how the files are used (Input, Output, etc.)
- Objects called or invoked by the object
- Modules bound by ILE or Service Programs
- Field differences in physical or logical files
- Key structure differences in physical or logical files

The following screen is displayed to get the report parameters.

MDC2KXF	COMPANY NAME	MDXREF
SCRN8	MD Object Comparison Report	10/27/11
		12:07:05
Basis Library . . _____		
Compare to Library _____		
Location . . . . . *LOCAL		
-----		
Comparison Type . . <u>1</u>	1=Basis Library Objects only	
	2=All Objects	
Compare Src Date . . _	Y/N	
Filter Objects by:		
Name . . . . . _____	Name, Generic*	
Attribute . . . . . _____		
Object Type . . . _____		
Enter=Confirm	F4=Browse	F11=View Output      F12=Previous

#### **Basis Library**

A library on the local system. A current MDXREF build for the library must exist in order for the results to be accurate. Press F4 to select the library from a list.

#### **Compare to Library**

A library on either the local system or on a remote system. A current MDXREF build for the library must exist on its system in order for the results to be accurate. A remote library comparison is only possible if MDCMS is also installed. Press F4 to select the library from a list.



**Location**

The location of the library. \*LOCAL indicates that the library is located on the current system. Otherwise the location is a network address defined in the MDCMS Synchronization Settings. Press F4 to select the location from a list.

**Comparison Type**

1. Report only on differences found for objects that exist in the basis library. For example, the basis library could be a product update library received from a vendor with 8 objects in it. The compare to library could then be your production library with 2000 objects in it. Only the 8 objects in the update library would be reviewed and reported upon.
2. All objects from both libraries are reported upon.

**Compare Src Date**

Include comparison, Y/N, for Source Date information of object.

**Filter Objects by**

Name

Attribute

Object Type

Enter information into one or more of the filter fields to limit the report to objects that match the filters.

## 5.2 Source Library Comparison

Function: To compare the source members in one library to the source members in another library.

The following differences are listed in the Source Comparison Report:

- Member existence
- Member contents
- Object Attribute
- Member Description
- Change Date/Time, if MDXREF is unable to compare contents

The following screen is displayed to get the report parameters.

MDC2KXF	COMPANY NAME	MDXREF
SCRN13	MD Source Comparison Report	21.04.13 19:00:42
Basis Library . . _____		
Compare to Library _____		
Location . . . . . *LOCAL _____		
Comparison Type . _	1=Basis Library Members only 2=All Members	
Include when Same. _	Y=Yes N=No O=Only	
Filter Members by:		
Name . . . . . _____	Name, Generic*	
Source File . . . _____	Name, Generic*	
Attribute . . . . . _____	Name, Generic*	
Enter=Confirm    F4=Browse    F11=View Output    F12=Previous		

### Basis Library

A library on the local system. A current MDXREF build for the library must exist in order for the results to be accurate. Press F4 to select the library from a list.

### Compare to Library

A library on either the local system or on a remote system. A current MDXREF build for the library must exist on its system in order for the results to be accurate. A remote library comparison is only possible if MDCMS is also installed. Press F4 to select the library from a list.

### Location

The location of the library. \*LOCAL indicates that the library is located on the current system. Otherwise the location is a network address defined in the MDCMS Synchronization Settings. Press F4 to select the location from a list.



**Comparison Type**

1. Report only on differences found for member that exist in the basis library. For example, the basis library could be a product update library received from a vendor with 8 members in it. The compare to library could then be your production library with 2000 members in it. Only the 8 members in the update library would be reviewed and reported upon.
2. All members from both libraries are reported upon.

**Include when Same**

Include each member in the list, even if it is identical to the member in the comparison library

Y – Yes, include all members

N – No, include only members with differences

O – Yes, include only members without differences

**Filter Members by**

Name

Source File

Attribute

Enter information into one or more of the filter fields to limit the report to members that match the filters.



### 5.3 Search for duplicate Objects between 2 Environments

Function: to report on the duplication of objects between 2 sets of libraries.

This report job does NOT use the information contained within the MDXREF database to look for object duplicates. The job retrieves the information from the libraries directly.

An object is considered a duplicate if it has the same name and object type as an object in the comparison library list.

The following screen is displayed to get the report parameters.

```

MDC2KXF                COMPANY NAME                MDXREF
SCRN9                   MD Duplicate Object Report  10/27/11
                                                           12:07:05

      Basis Libraries: _____ Compare to Libraries: _____
                        _____ or _____
                        _____ *USRLIBL _____
                        _____ or _____
                        _____ *ALLUSR _____
                        _____

      Comparison Type: 1  1=Duplicate Objects
                        2=Objects unique to Basis Libl
                        3=Objects unique to Compare Libl
                        4=All the Above

      Filter Objects by
      Name.....: _____ Name, Generic*
      Attribute..: _____
      Object Type: _____

Enter=Confirm   F4=Browse   F11=View Output   F12=Previous
  
```

#### Basis Libraries/Compare to Libraries

The 2 lists of libraries used in the comparison. For the libraries to be compared to, the special value of \*USRLIBL (for all user libraries in the active job) or \*ALLUSR (for all user libraries on the system) may be entered.

#### Comparison Type

1. Report only the objects that are found in both sets of libraries.
2. Report only objects that are found only in the Basis library list.
3. Report only objects that are found only in the Compare to library list.
4. Report all objects in both library lists

#### Filter Objects by

Enter information into one or more of the filter fields to limit the report to objects that match the filters.





## 5.4 Check usage of a Library

Function: to report on whether or not any objects within a library have been used since a specified date.

The following screen is displayed to get the report parameters.

```

MDC2KXF                                COMPANY NAME                                MDXREF
SCRN11                                  MD Library Usage Report                            10/27/11
                                                    22:14:48

      Library: _____

      Report Type: 1                1=only unused Objects
                                       2=only used Objects
                                       3=All Objects

      Minimum last used Date: 10/27/10

      List Dependencies: Y                Y/N

      Filter Objects by
      Name.....: _____ Name, Generic*
      Attribute..: _____
      Object Type: _____

Enter=Confirm      F4=Browse      F11=View Output      F12=Previous
  
```

### Library

The library to inspect. It is NOT necessary that the library is cross-referenced.

### Comparison Type

1. Report only the objects that haven't been used since the minimum date
2. Report only objects that that have been used since the minimum date
3. Report all objects in the library

### Filter Objects by

Enter information into one or more of the filter fields to limit the report to objects that match the filters.



## 5.5 Search for Fields

Function: to search for, and report on, all physical or logical files that contain a specific field or field attribute. Additionally, to inspect source code for the usage of specific fields.

### 5.5.1 Field Search

```

MDCIPFS                                COMPANY NAME                                07/24/14
SCRN1                                  MDXREF Field Search                               15:25:13

Type choices, press Enter.

Field Name . . . . . _____ *gen*eric*
Field Description . _____ *NONE, *gen*eric*
Field Alt. Name . . _____ *NONE, *gen*eric*
Ref. Field Name . . _____ *NONE, *gen*eric*
Field Type . . . . . _

                                Minimum  Maximum
Field Length . . . _____
Decimal Places . . _____

File Name . . . . . _____ *gen*eric*
File Library . . . _____ *gen*eric*
Include LF Files . _____ Y

Application . . . . _____
Level . . . . . _____

F3=Exit   F4=Browse   F5=Refresh   F11=View Output   F21=Sys Command
  
```

The search screen provides a number of search criteria. When Enter is pressed, all fields that meet ALL entered criteria will be listed.

#### **Field Name**

The system name for the field

\* may be used as a generic wildcard anywhere within the value

#### **Field Description**

The description text for a field

\*NONE – include only fields that don't have a description defined

\* may be used as a generic wildcard anywhere within the value

#### **Field Alt. Name**

The alternate or SQL name for the field

\*NONE – include only fields that don't have an alternate name

\* may be used as a generic wildcard anywhere within the value

#### **Ref. Field Name**

The name of the reference field providing attributes for the field

\*NONE – include only fields that don't use a reference field

\* may be used as a generic wildcard anywhere within the value



**Field Type**

The type of field

Options for Field Type:

C=Any Character Type (A, G, H, S)

N=Any Numerical Type (B, F, S, P)

A=Character

B=Binary

E=DBCS Either

F=Floating Point

G=DBCS Graphic

H=Hexadecimal

J=DBCS Only

L=Date

O=DBCS Open

P=Packed decimal

S=Zoned decimal

T=Time

Z=Timestamp

5=Binary character

**Field Length**

Enter the minimum and/or maximum lengths of fields to be included in the search results. For packed numeric fields, the decimal length is considered rather than the byte length.

**Decimal Places**

Enter the minimum and/or maximum number of decimal places that a field must have in order to be included in the search results.

**File Name**

The system name for the file

\* may be used as a generic wildcard anywhere within the value

**File Library**

The system name of the library containing the files

\* may be used as a generic wildcard anywhere within the value

**Include LF Files**

Y – Include Logical files in the search. Otherwise, only Physical files will be included.

**Application**

The MDXREF Application containing the files

**Level**

The MDXREF Level containing the files



## **5.5.2 Field Search Results**

The Field Search Result listing screen displays each distinct Library, File and Field that meet the search criteria.

### **Opt**

1 – Source containing Field – this option causes MDXREF to collect the source for all objects either directly using the file or a logical over the file, along with all copybooks used by dependent programs. It then inspects the code for any non-commented lines containing the field and then presents the results.

### **Function Keys:**

**F9** – toggle the display between the field description and the alternate field name

**F15** – generate report in MD Output of all field search results



## 5.6 Search for Query Definitions

Function: to report on all query definitions that meet the entered criteria.

To accurately track the running of queries using the RUNQRY command, an optional logging program – MDXREF/MDLQLOG – has been created to log the usage of a query (what, when and by who) each time the command RUNQRY is performed. To use this functionality, just run the following command: **CHGCMD CMD(QSYS/RUNQRY) VLDCKR(MDXREF/MDLQLOG)**.

**NOTE:** Be sure to run the command for all QSYS-Language libraries each time the operating system is upgraded.

The following screen is displayed to get the report parameters.

MDC2KXF	COMPANY NAME	MDXREF
SCRN11	Query Search	10/27/11
Filters (blank = all):		22:26:12
Query Name . . . . . _____	*Generic*	
Library . . . . . _____	*Generic*	
Description . . . . . _____	*Generic*	
Creator . . . . . _____	*Generic*	
Creation Date:		
Minimum . . . . . _____		
Maximum . . . . . _____		
Usage Date:		
Minimum . . . . . _____		
Maximum . . . . . _____		
File Used . . . . . _____	*Generic*	
File Library . . . . . _____	*Generic*	
Field Used . . . . . _____	*Generic*	
Field Type . . . . . _____	Condition, Display, Group, Sort	
F3=Exit	F5=Refresh	F6=Messages
	F8=Submitted Jobs	F11=View Output

### Filters

Enter information into one or more of the filter fields to limit the report to queries that match the filters.



## 5.7 Process Flow Reports for Level

Function: to report on the flow of all execution objects for an application level.

MDC2KXF	COMPANY NAME	MDXREF
SCRN7	MD Process Flow Reports	10/27/13
	Appl: __ Lvl: __	12:05:38
Starting Object Name . . . . .	*ALL	
Starting Object Library . . . . .	_____	library, generic*
Starting Object Type . . . . .	_____	type
Generate Process Flow Report . . . . .	__	Y/N
Generate Object Catalog . . . . .	__	Y/N
Generate File Usage Report . . . . .	__	Y/N
Object Filter Definition . . . . .	_____	definition
Maximum Call Stack Depth . . . . .	<u>52</u>	1-256
File Usage Report Filters:		
File Name . . . . .	_____	name, generic*
File Attribute . . . . .	_____	attribute
File Usage . . . . .	_____	usage
File Filter Definition . . . . .	_____	definition
Enter=Confirm F4=Browse F11=View Output F12=Previous		

### 5.7.1 Generate Process Flow Report

Create a report that shows each distinct call stack possible for the entered application/level. A call stack starting point is any command, menu or program in the level that isn't called by something else.

Each column in the report represents the depth of the object in that stack, meaning that the object in column 1 is a starting point and it calls the object in column 2 which calls the object in column 3, etc.

If an object in the stack had previously been listed in the report, and that object calls other objects, it will be listed with \*REPEAT as the value in the proceeding column.

#### 5.7.1.1 Process Flow Report Filters

The Process Flow Report can be further filtered by the following parameters:

**Appl**

The application code

**Lvl**

The application level

**Starting Object Library**

The report may be filtered to consider commands, menus and programs as starting points only if they reside in the specified library or libraries.

### **Starting Object Type**

The report may be filtered to consider either only \*AJSE, \*CMD, \*IWS, \*MENU, \*PGM, \*RBTJOB, \*SCDE or \*SQLPRC object types as starting points.

### **Object Filter Definition**

A filter definition can be selected in order to omit certain libraries or objects from the Process Flow reports. Press F4 to create, modify or select a Filter Definition.

### **Maximum Call Stack Depth**

The depth of the reported stack can be limited to between 1 and 256 columns

## **5.7.2 Generate Object Catalog**

Create a report that alphabetically lists every object invoked in the Process Flow Report. In addition to the name of the object, the library, type, attribute, description, create date, create time, source change date and source change time are also listed.

## **5.7.3 Generate File Usage Report**

Create a report that alphabetically lists every file that is used within the process flow as well as which objects use the file and how the file is used.

### **5.7.3.1 File Usage Report Filters**

The File Usage Report can be further filtered by the following parameters:

#### **File Name**

The report may be filtered to show only a specific file or, with the use of '\*', files beginning with a specific character string.

#### **File Attribute**

The report may be filtered to show only files with a specific attribute. For example, enter LF to show only logical files.

#### **File Usage**

The report may be filtered to show only objects that use a file in a certain way. For example, enter I/O to show only objects that read and write to a file.

#### **File Filter Definition**

A filter definition can be selected in order to omit certain libraries or files from the Usage report. Press F4 to create, modify or select a Filter Definition.



## 6 Reporting

Reports (MD Output) generated within MDSEC, MDXREF and MDCMS can be viewed, printed, exported or emailed by pressing **F11** from most screens.

MDCOUTF	MD Production 6.1			10.03.12							
SCRN1	MD Output			17:47:05							
	User	Report	Object								
Filter by:	<u>MMORGAN</u>	_____	_____								
Type options, press Enter.											
3=Copy to PF 4=Delete 5=Display 6=Print E=Export											
Opt	User	Date	Time	Report	Object	Library	Length	Width			
—	MMORGAN	24.02.11	17:36:18	PGMSRCH	MDDCLWD	MDCMST	107	80			
—	MMORGAN	31.03.11	9:10:05	RFPHIST			142	92			
—	MMORGAN	14.04.11	21:34:18	LIBCOMP	MDCMS	MDCMST	28	120			
—	MMORGAN	23.05.11	20:50:20	COMPARE	MDDCMSE	MDCMST	121	315			
—	MMORGAN	23.05.11	20:53:01	JOURNAL	MDACST	MDADM	15	643			
—	MMORGAN	23.05.11	21:01:39	PGMSRCH	MDDCMSD	MDCMST	200	80			
—	MMORGAN	29.09.11	9:23:16	PROJECT			25	92			
—	MMORGAN	15.11.11	22:27:49	FLDLIST	MDDTASK	MDCMST	56	112			
—	MMORGAN	22.02.12	13:42:05	JOURNAL	MDAINV	MDADM	41	130			
—	MMORGAN	5.03.12	16:03:41	RFPHIST			27	92			
							Bottom				
F3=Exit		F4=Browse		F5=Refresh		F7=Spooled Output		F17=Top		F18=Bottom	

### Filters

Enter a value into a filter field to limit the listing to items matching the filter(s). Possible values may be selected by pressing **F4=Browse** while the cursor is positioned on the filter field.

### Options

3=Copy to PF – Copy the detail contents of the report into a formatted table (DDS Physical File). This provides a simple means to extract information out of the MD database for use in SQL, Queries or programs.

4=Delete – permanently delete the report

5=Display – view the report contents directly in the screen

6=Print – print the report contents to a spooled file

E=Export – Export the report to a CSV, PDF, TXT or XLSX formatted file. The file can be placed in IFS or emailed to one or more recipients. See the parameters for command MDRUNRPT for more information.

### Function Keys:

**F4=Browse** – Browse possible values for a filter field

**F5=Refresh**

**F7=Spooled Output** – Display and manage spooled files

**F17=Top** – Position Cursor to the first entry in the list

**F18=Bottom** – Position Cursor to the last entry in the list





## 6.1 MDRUNRPT – Run MD Report command

Certain reports within MDSEC, MDXREF and MDCMS allow for saved report definitions to be run directly from a command line. This gives the users the ability to schedule reports to be run on a periodic basis and to have the output automatically printed or exported. This is also helpful during Project testing to allow the same parameters to be quickly used after each phase of a test.

The following screen is displayed to get the report run parameters.

```

                                Run MD Report (MDRUNRPT)

Type choices, press Enter.

Report Name . . . . . _____ COMPARE, JOURNAL, MDSEC...
User Profile . . . . . _____ User Profile
Report Definition . . . . . _____

-----
MDCMS Instance . . . . . *DFT          *DFT, *SAME, Instance
Print result to spooled file . . *NO          *YES, *NO
Copy result to physical file . . *NO          *YES, *NO
Export result to IFS file . . . . *NO          *YES, *NO
Email result . . . . . *NO          *YES, *NO
Filename . . . . . _____

-----
Append Timestamp to filename . . *YES         *YES, *NO
Directory . . . . . _____

-----
Report Format . . . . . XLSX          CSV, PDF, TXT, XLSX
csv Field Delimiter . . . . . ', '      Field Delimiter
Address to receive Email . . . . *NONE

-----
User to receive Email . . . . . *NONE      User ID
Group to receive Email . . . . . *NONE      Group ID

F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys

```

Use **F9=All parameters** to see all available parameters for command.

### Report Name

- COMPARE – the MDXREF Data Comparison Report
- JOURNAL – the MD Journal Analysis Report
- MDSEC – the MDSEC Authorization Report
- NOTCMS – the MDCMS Audit Report listing object changes made outside of MDCMS
- PROJECT – the MDCMS Project Report
- PRJTASK – the MDCMS Project Task Report
- RFPHIST – the MDCMS Audit Report listing object changes made within MDCMS

### User Profile

The name of the user profile that defined the report definition

### Report Definition

The name of the report definition

### Print result to spooled file

- \*NO – the resulting report will not be automatically printed to a spooled file
- \*YES – the resulting report will be automatically printed to a spooled file



Copy result to physical file

- \*NO – the resulting report will not be automatically exported to a physical file
- \*YES – the resulting report will be automatically exported to a physical file (table)

Export result to IFS file

- \*NO – the resulting report will not be automatically exported to an IFS file
- \*YES – the resulting report will be automatically exported to an IFS file

Email result

- \*NO – the resulting report will not be automatically emailed to recipients
- \*YES – the resulting report will be automatically emailed to recipients

Copy to Physical file

The name of the physical file (table) to contain the detail contents of the report. Each column in the report will be placed in a separate formatted field. If the file already exists, it will be replaced.

Copy to Library

The IBM i library that is to contain the Physical file

Filename

If the results are to be exported or emailed, this is the name of the IFS file to receive the results. The file type (.CSV, .PDF, .TXT or .XLSX) will be automatically appended to the end of the name.

Timestamp

- \*NO – a timestamp will not be appended to the file name
- \*YES – a timestamp in the format of YYYYMMDD\_HHMMSS will be appended to the file name

Directory

If the results are to be exported, this is the name of the IFS directory to receive the results. The directory path should begin with the root character “/”.

Report Format

- CSV – the exported report will be placed in a comma separated value file which can then be opened in Microsoft excel or similar spreadsheet programs.
- PDF - the exported report will be converted to PDF. JVM 1.6 or higher is required
- TXT – the exported report will be placed in a text file with the same layout as the on-line report.
- XLSX – the exported report will be converted to the excel format. JVM 1.6 or higher is required

csv Field Delimiter

The character to be used to separate fields in a csv file

Address to receive Email

A specific email address to receive the report

User to receive Email

A user id to receive the report - the address for the user will be retrieved from the MDSEC email address table.

Group to receive Email

All users for the entered group id to receive the report – this parameter requires MDWorkflow groups to be present.

## 6.2 MDEXPSPLF – Export Spooled File command

The MDEXPSPLF command provides the functionality to export any spooled file to a text or PDF file.

The following screen is displayed to get the parameters.

```

MD Export Spool File (MDEXPSPLF)

Type choices, press Enter.

Spool Name . . . . . _____ Spool Name
Job Name . . . . . *CURRENT *CURRENT, Job Name
Job Number . . . . . _____ Job Number
Job User . . . . . _____ Job User
Spooled file number . . . . . *LAST *LAST, 1-999999
MDCMS Instance . . . . . *DFT *DFT, Instance
Format . . . . . PDF PDF, TXT
File Name . . . . . _____

Append Timestamp to filename . . *YES *YES, *NO
Report Title . . . . . _____

Page Layout . . . . . *DFT *DFT, AUTOMATIC, LANDSCAPE. . .
Page Size . . . . . *DFT *DFT, A3, A4, A5, B5...
Add Page Number to each Page . . *NO *YES, *NO
Export result to IFS file . . . > *YES *YES, *NO
Email result . . . . . > *YES *YES, *NO
Directory . . . . . _____

Address to receive Email . . . . *NONE

User to receive Email . . . . . *NONE User ID
Group to receive Email . . . . . *NONE Group ID

F3=Exit F4=Prompt F5=Refresh F12=Cancel F13=How to use this display
F24=More keys

```

### **Spool Name**

The name of a spooled file

### **Job Name**

The name of the job that generated the spooled file or \*CURRENT to look for the spooled file in the current job

### **Job Number**

The number of the job that generated the spooled file

### **Job User**

The user profile of the job that generated the spooled file Report Header

### **Spooled File Number**

The number of the spooled file within the job or \*LAST to use the most recently generated spooled file of the given name for the given job.

### **MDCMS Instance**

A 1-4 character string of the suffix for an existing instance of MDXREF or \*DFT to use MDXREF



**Format**

PDF – the spooled file will be converted to the PDF format. JVM 1.5 is required

TXT – the spooled file will be converted to a text file

**File Name**

If the results are to be exported or emailed, this is the name of the IFS file to receive the results. The file type (.pdf or .txt) will be automatically appended to the end of the name.

**Append Timestamp to filename**

\*NO – a timestamp will not be appended to the file name

\*YES – a timestamp in the format of YYYYMMDD\_HHMMSS will be appended to the file name

**Report Title**

The title to place in the header of the PDF file and in the subject line of the email

**Page Layout**

Values for PDF format:

\*DFT – the layout defined in data area MDSEC(instance)/MDPDFLAYOUT

AUTOMATIC – the layout is determined automatically based on the width of the spooled file

LANDSCAPE – the paper is rotated so that the wide edge is horizontal

PORTRAIT – the paper is rotated so that the wide edge is vertical

**Page Size**

Values for PDF format:

\*DFT – the size defined in data area MDSEC(instance)/MDPDFSIZE

A3, A4, A5, B5, LEGAL, LETTER

**Add Page Number to each Page**

\*NO – a page number will not be added to each page

\*YES – a page number will be added to each page in the bottom right corner

**Export result to IFS file**

\*NO – the resulting report will not be automatically exported to an IFS file

\*YES – the resulting report will be automatically exported to an IFS file

**Email result**

\*NO – the resulting report will not be automatically emailed to recipients

\*YES – the resulting report will be automatically emailed to recipients.

**Directory**

If the results are to be exported, this is the name of the IFS directory to receive the results. The directory path should begin with the root character “/”.

**Address to receive Email**

A specific email address to receive the report

**User to receive Email**

A user id to receive the report - the address for the user will be retrieved from the MDSEC email address table.

**Group to receive Email**

All users for the entered group id to receive the report – this parameter requires that MDWorkflow groups are present.