# Programmatic Access to MPE's HELP Subsystem

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HELPROC is the programmatic interface to MPE's HELP facility. It is callable from user mode programs. This ERS documents the usage of HELPROC for any users interested in adding a HELP facility to their application program.

HELPROC is not currently an intrinsic; it is a system-callable procedure. We will be considering adding it to the system intrinsic set in the near future. HELPROC has been in the system for many years; thus, we cannot consider changing its externals without considering backwards-compatability issues.

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## ABSTRACT

MPE's HELP facility has a programmatic access that is callable from user mode programs. This access may be used with a previously prepared HELP catalog (such as CICAT.PUB.SYS) to provide a HELP facility for application programs. This document describes the usage of this system feature.

## OVERVIEW

MPE's HELP command provides documentation on all MPE commands as well as some additional MPE features. A user may access this information in one of two ways:

1. The user may specify no parameters to the HELP command; in this case, the user will enter the HELP subsystem mode in which all command entries will be requests for additional information on the entered command (The user leaves the subsystem mode by entering "EXIT").

2. The user may specify one or two parameters to the HELP command; in this case, the user will receive the information requested and will be returned to the user's command interpreter for the next command entry.

The information displayed by the HELP command is stored in a catalog file called CICAT in PUB.SYS. This file is a regular, numbered EDITOR file that has been prepared as a HELP catalog by the HELP entry to MAKECAT.PUB.SYS. Unlike CATALOG.PUB.SYS, this file is not opened by the system; rather, it is opened only when needed (i.e., when a HELP command has been issued on the system). Thus, replacing the system's HELP catalog is done by purging the old CICAT.PUB.SYS, preparing a new catalog by running MAKECAT.PUB.SYS,HELP, and renaming the resultant file CICAT.PUB.SYS. The internal format of the HELP catalog and the usage of MAKECAT.PUB.SYS to prepare the catalog will be discussed later.

The Command Interpreter executes a HELP command by performing the following steps:

1. It opens CICAT.PUB.SYS,

2. It calls the procedure, HELPROC, passing it (among other things) the filenumber of CICAT, and

3. It closes CICAT.PUB.SYS when HELPROC is done.

HELPROC is a system procedure that is callable from user mode. It requires a filenumber of an opened, prepared catalog file as one of its parameters. Thus, a user wishing to add a HELP facility to an existing application program need only to do the following:

1. He must create a catalog file with the information to be displayed to the user,

2. He must prepare the catalog file with MAKECAT.PUB.SYS,HELP, and

3. He must modify the application program to do the following:
    a. It must open the prepared catalog,
    b. It must call HELPROC, and
    c. It may close the catalog when done.

The HELP facility in the application program will then behave in a manner similar to MPE's HELP facility. Thus, depending on the call, the application's HELP facility will either operate in "subsystem mode" or will return to the application program once specific information has been displayed.

The remainder of this document covers

1. The specifications of the procedure, HELPROC,
2. The internal format of a HELP catalog file, and
3. The methods used to prepare a HELP catalog with MAKECAT.PUB.SYS.

Note: some users may wish to merge information on various tools and applications with the system catalog, CICAT. These users may accomplish this by appending the desired information to the file and running MAKECAT again and replacing CICAT.PUB.SYS with the new, resulting file. In this way, the MPE HELP command can access information on that users' applications.

## HELPROC Specifications

Accesses the MPE HELP facility.

**Syntax**

```
               IV      IV       BA        BA     I       LV
    HELPROC ( catnum, listnum, comimage, combase, err, onecharprmpt );
```

HELPROC accesses the HELP catalog specified by catnum and will display the information specified by comimage and combase to the file specified by listnum. Additionally, according to the information in comimage and combase, the HELP facility may be invoked in "subsystem mode" in which additional information may be requested until the user enters "EXIT" (which would then cause HELPROC to return to the calling procedure). This subsystem mode access is further specified in the Parameters section, below.

NOTE: The HELP catalog file must have been previously prepared by MAKECAT.PUB.SYS. The catalog file must be opened with foptions old, permanent, ASCII (foptions 5), and with aoptions nobuf and multirecord access (aoptions %420).

Functional Return: None.

Restrictions: No split stack calls.

### Parameters

catnum — integer by value (required). A word identifier supplying the file number of the HELP catalog file. See NOTE above.

listnum — integer by value (required). File number (returned by FOPEN) of the file to which all HELP text is listed. Note that error messages and input prompts are always printed to the $STDLIST of the calling process. If listnum = 0, then all HELP text is printed to the calling process's $STDLIST.

comimage — byte array (required). This parameter points to a byte array character "string" specifying the information requested for this invocation of the HELP facility. This array must be terminated by a carriage return. If this string consists of any number of blanks followed by a carriage return, then the HELP facility enters "subsystem mode," in which the user will continuously request information until the HELP facility is terminated by the "EXIT" command. See description below in the Operation section for information on the expected format for information specification. Additional information may be found in the description of the internal catalog format.

combase — byte array (required). This parameter points to the "base" of the string used to invoke the HELP facility. Thus, if the user had entered "HELP SHOWOUT, ALL", this parameter would point to the "H" and comimage would point to the "S." This array is reused by subsystem mode.

err — integer (required). Word value to which an error number is returned if an error is detected by the HELP facility. These errors are those errors considered fatal to HELPROC; HELPROC can handle non-fatal errors like bad syntax in the input. HELPROC prints its own error messages for all errors detected. These fatal errors are

42→End-of-file on $STDIN.
51→Error detected in reading catalog file.
52→No user labels for directory in catalog. (Catalog file may not have been prepared by MAKECAT.PUB.SYS).
53→No directory in catalog file user labels. (Catalog file may not have been prepared by MAKECAT.PUB.SYS).
54→Bad format of directory in catalog file user labels or error detected in attempting to read directory. (Catalog file may not have been prepared by MAKECAT.PUB.SYS).
55→Unable to open $STDIN.
56→Error detected in attempting to read from $STDIN.
57→Error detected in attempting to write to the HELP text list file.

If no fatal errors are detected by HELPROC, a zero is returned to err.

onecharprmpt — logical by value (required). Logical word value that specifies that a one character prompt was used with the command invokation of the Help facility. If a one character prompt was in fact used, then any error messages may have a caret ("^") printed under the part of the invokation in error. If some other number of characters was used for the prompt, then the Help facility will not be able to place the caret in the correct location — thus, if FALSE is the value specified for this parameter, no caret is printed with any error message.

Condition Codes

Not returned by this procedure.

### Operation

This section discusses the operation of the HELPROC procedure; refer to later sections for information on how to format a catalog file and how to prepare the file for use.

Information in a help catalog is organized in an heirarchical structure. The help catalog consists of a set of entries; each entry has optional header information and an optional number of items; each item has optional header information and an optional number of subitems. Additionally, each catalog has a special table of contents entry (typically called "HELPMENU") — this entry is printed by default when the HELP facility is entered in subsystem mode. This entry is always the first entry in the catalog; its item and subitem names are considered part of the table of contents.

Invokation of the HELP facility may take many forms. These are specified by the contents of the parameter, comimage. The varieties of the different calls and a brief description of each are presented below. Note that comimage is always terminated by a carriage return.

**Comimage contents     Description**

(blank line) — Print table of contents entry header, and enter subsystem mode. Keyword list consists of all the item and subitem names of the table of contents entry.

Table of Contents—Item Name — Print all the information in that item's header and all the information in all the associated subitems. Keyword list consists of all the item and subitem names of the table of contents entry. HELPROC terminates when printing is done.

Table of Contents—Subitem Name — Print all the information in that subitem's block. Keyword list consists of all the item and subitem names for the table of contents entry. HELPROC terminates when printing is done.

"ALL" — Print all the information in the table of contents entry including all item and subitem information. Keyword list consists of all item and subitem names of the table of contents entry. HELPROC terminates when printing is done.

Entry Name — Prints all the information in the header for the associated entry. Keyword list consists of all the item and subitem names for that entry. HELPROC terminates when printing is done.

Entry Name, Item Name — Prints all the information in the indicated item's header as well as any information in that item's subitems. Keyword list consists of all the item and subitem names for that entry. HELPROC terminates when printing is done.

Entry Name, Subitem Name — Prints all the information in the indicated subitem. Keyword list consists of all the item and subitem names for that entry. HELPROC terminates when printing is done.

Entry Name, ALL — Prints all the information in the indicated entry including all item and subitem information. Keyword list consists of all the item and subitem names for that entry. HELPROC terminates when printing is done.

In subsystem mode, the HELP facility performs the same as above with two exceptions: (1) HELPROC does not terminate after printing information — the user must enter "EXIT" to terminate the procedure; and (2) a blank line will cause the next block of information to be printed — thus, when the user enters an entry name, that entry's header information is printed; if the user then enters a blank line, that entry's first item information will be printed (after the last item has been printed, a blank line will cause the next entry header to be printed). Any fatal error will terminate subsystem mode; note that being unable to find the requested information is not considered a fatal error.

In all cases, HELPROC will open $STDIN, but $STDIN is only used in subsystem mode — HELPROC reads user requests for information from $STDIN into combase.

### Helpful Hints

1. Testing your catalog file: You need not have your program ready in order to determine whether your catalog is formatted correctly. Format your file with MAKECAT.PUB.SYS (documented in a later section). If MAKECAT determines that your catalog file is syntaxically correct, you may use MPE's HELP command to view it. Suppose the resultant catalog file from MAKECAT is called "MYHELP." Enter the following :FILE command:

    :FILE CICAT.PUB.SYS = MYHELP

Then, for the rest of your session (or until you :RESET the :FILE equation), HELP commands will open your catalog instead of MPE's HELP catalog. It is often useful to view your catalog file in this manner after running MAKECAT.PUB. SYS. In order to restore MPE's HELP command back to its original condition, enter the command

    :RESET CICAT.PUB.SYS

Note that this method of testing only effects your session. Other jobs and sessions will be able to access CICAT.PUB.SYS while you are testing your catalog.

2. Testing your program: Similarly, you need not have your catalog ready in order to test the HELP facility in your program. Assuming the same

names in the example above, you may issue the following :FILE command

:FILE MYHELP = CICAT.PUB.SYS

Since you FOPEN of the catalog file in your program should allow :FILE equations, this command would open MPE's HELP catalog instead. This is often useful in testing your program.

Stack Size: The HELP facility uses a directory to find information in the catalog file. This directory must fit on the process's stack. The space needed by the HELP facility currently is 3650 words. Use of the intrinsic, ZSIZE, before a call to HELPROC can assure that there is sufficient stack space for HELPROC.

## INTERNAL CATALOG FORMAT

Overview: The source file for a catalog file should be either another catalog file or a standard, numbered EDITOR file. MAKECAT creates the resulting file as a new file; thus, the group which holds the resulting catalog file should have ample file space. Further, MAKECAT inserts new records into the file in certain circumstances (see CONTINUE, below). Thus, it is advisable to have ample line number space between the lines of the source EDITOR file.

All record lines that have a backslash ("\") in column one are considered to be an internal directive to MAKECAT and HELPROC. Thus, no text lines can have a backslash in column one. The backslash is followed immediately by a keyword and some other parameters. The current keyword list and a brief description is given below; a more detailed description for each follows.

| Keyword | Description |
|---|---|
| \ENTRY | Start of the next entry text block. |
| \ITEM | Start of the next item text block. |
| \SUBITEM | Start of the next subitem text block. |
| \STOPHELP | Initiates skipping of text in building catalog. |
| \STARTHELP | Undoes the effect of previous \STOPHELP. |
| \SUBSET | Causes text between \STOPHELP and \STARTHELP to be removed from resulting catalog. |
| \CONTINUE | Provided by MAKECAT to handle overflowing \ENTRY lines. |
| \ALL | Indicates the end of the catalog file. |

MAKECAT modifies these records freely. The syntax reported below is the syntax expected in the source catalog. The discussion for each keyword explains the modifications made by MAKECAT. In all cases, MAKECAT can take a prepared catalog as its source catalog — MAKECAT ignores its own modification present in the source catalog.

\ENTRY

Syntax:   \ENTRY=<entryname> [, <other information> ]

The presence of this record terminates the text to the previous entry; the next non-keyword record (a line not starting with a "\") is the first line of the entry text for an entry called "<entryname>." other information present on this record in the source catalog file will be ignored.

MAKECAT echoes this line in the resulting catalog file with some modifications. The keyword list (i.e. all item and subitem names) for this entry is appended to the end of the line. If the keyword list overflows the line, MAKECAT will create a CONTINUE line to hold additional keywords. If sufficient line number space is not available following the ENTRY record for any needed CONTINUE record, MAKECAT will not be able to format the catalog; an error message is issued in this case.

\ITEM

Syntax:   \ITEM=<itemname>

If this keyword record is the first keyword record following a ENTRY record (exception: see STARTHELP and STOPHELP), then this record terminates the "header" text for that entry; otherwise this record terminates the text for the previous item or subitem. The following non-keyword records will comprise the text for the item called "<itemname>." This text, in turn, will be terminated by either the next ITEM record, the next ENTRY record, or the end of the file, whichever comes first.

"<itemname>" becomes a keyword for the previous entry and gets added to the ENTRY record or the associated CONTINUE record.

\SUBITEM

Syntax:   \SUBITEM=<subitemname>

If this keyword record is the first keyword record following a ITEM record (exception: see STARTHELP and STOPHELP), then this record terminates

the "header" text for that item; otherwise this record terminates the text for the previous subitem. The following non-keyword records will comprise the text for the subitem called "<subitemname This text is considered part of the text for the previous ITEM record, and is, in turn, terminated by the next SUBITEM record, the next ITEM record, the next ENTRY record, or the end of the file, whichever comes first.

"<subitemname>" becomes a keyword for the previous entry and gets added to the ENTRY record or the associated CONTINUE record.

\CONTINUE

Syntax:    \CONTINUE,<keywordlist>

The presence of a CONTINUE record in the source catalog is ignored by MAKECAT. These records are created when the keyword list for a ENTRY overflows the ENTRY record. MAKECAT attempts to place the CONTINUE record directly after the ENTRY record, or if other CONTINUE records have already been created, after the last CONTINUE record. If line number space does not exist for the creation of the CONTINUE record, MAKECAT prints an error message and terminates.

\STOPHELP

Syntax:    \STOPHELP

The presence of a STOPHELP record will cause MAKECAT to ignore records in the source catalog until it finds the next STARTHELP record. These records will be copied to the resulting file (exception: see SUBSET), but the text and the keywords are ignored by both MAKECAT and HELPROC. This feature is used to void blocks of text from the source catalog.

\STARTHELP

Syntax:    \STARTHELP

The presence of a STARTHELP record will cause MAKECAT and HELPROC to resume processing the text and keyword records in the source catalog. Note that a STARTHELP record need not follow a STOPHELP; thus, a single STARTHELP can be used to void a single line in the source file.

\SUBSET

Syntax:    \SUBSET

The presence of a SUBSET record will stop the copying of text between a STOPHELP and a STARTHELP (as well as all STOPHELP and STARTHELP records themselves) from the source file to the resulting file. This is used to compress the file size.

\ALL

Syntax:    \ALL

This record terminates the source catalog. It must be the last record in the source file.

## EXAMPLE SOURCE CATALOG

The following is an example of a small source catalog. The line numbers are added for reference and may be assumed to be EDITOR line numbers.

```
 1  \entry=helpmenu
 2      This is the text for the "header" of the
 3  catalog. This text will be printed when the
 4  HELP facility is entered in subsystem mode.
 5  \item=jobs
 6      This is the text for the "header" of an
 7  item called "jobs".
 8  \subitem=limit
 9      Subitem "limit" text.
10  \subitem=logon
11      Subitem "logon" text.
12  \item=sessions
13      This is the text for the next item, which
14  is called, "sessions".
15  \stophelp
16      All text here is ignored and is unaccessable
17  from the HELP facility.
18  \starthelp
19      This text is the continuation of text for the
20  item call "sessions".
21
22  \entry=usage
23      This is a new entry heading.
24
25      The next \line will terminate the help catalog,
26      these lines are text for "usage".
27  \all
```

The appearance of the resulting file once MAKECAT.PUB.SYS in run will be essentially the same as above with the exception of line 1. This line will appear in the following form:

```
1 \entry=helpmenu,jobs,limit,logon,sessions
```

Had a " subset" line been added at line number 0.1 (and if the SUBSET facility was working properly), the resulting file would have had lines 0.1, and lines 15 through 18 deleted.

## PREPARING THE HELP CATALOG WITH MAKECAT.PUB.SYS

The system utility program, MAKECAT, (typically residing in PUB.SYS) is used to prepare a catalog for use by HELPROC. Unless you are replacing the system HELP catalog, CICAT.PUB.SYS, no special capabilities are needed to use MAKECAT. The "HELP" entry point must be used.

Preparation of the catalog consists of syntax checking of the catalog format and the creation of a entry directory to be stored in the user labels of the resulting catalog file.

MAKECAT uses two formal file equations in preparing help catalogs. The file called INPUT is the source catalog, and the file called HELPCAT is the resulting catalog that may be used with HELPROC. Thus, if a user has a file called SCAT1 that he/she wishes to use as a help catalog and if the user wishes the resulting help catalog to be called HELPTEXT, then the following command sequence prepares the catalog:

```
:FILE INPUT = SCAT1
:FILE HELPCAT = HELPTEXT
:RUN MAKECAT.PUB.SYS,HELP
```

If MAKECAT produces the message, "VALID MESSAGE FILE," then the file called HELPTEXT (produced by MAKECAT) can be used with HELPROC. If MAKECAT is unable to produce a valid catalog file, it will produce an error message and terminate in the error state. The error conditions reported by MAKECAT for HELP catalog preparation include

```
** FILE ERROR ON INPUT:  Unable to either open or access the file
        associated with the formal designator, INPUT.

** FILE ERROR ON CATALOG:  Unable to open, close, or access the file
        associated with the formal designator, HELPCAT.

** FILE ERROR ON LIST:  MAKECAT opens a file called LIST (default
        to $STDLIST unless overridden by a :FILE equation).  This
        error is reported if MAKECAT cannot open the file.

** CONTINUATION FREADDIR ERROR   and
** CONTINUATION FWRITEDIR ERROR:  MAKECAT needs to shuffle around the
        directory in order to make room for \CONTINUE records.
        This error is reported in MAKECAT has trouble accessing
        the directory in the file's user labels.

** INSUFF. LINE # SPACE FOR CONTINUATION:  MAKECAT creates extra
        lines for \CONTINUE records after \ENTRY (or other
        \CONTINUE) records by incrementing the eight character
        sequence number in the last eight positions of the
        record line.  This sequence error occurs when the next
        record's sequence number does not allow the creation
        of the new record.  The solution in this case to to
        text the file into the EDITOR and renumber the file with
        a "GATHER ALL" command.  (Note:  EDITOR line numbers when
        viewed as the eight character sequence number at the end
        of record are incremented by 1000 between integer line
        numbers--this is more than ample space for the \CONTINUE
        records which would be incremented by .001 as the EDITOR
        does line numbering.)

** KEYWORD LIST WON'T FIT:  MAKECAT detected a keyword too large to
        fit onto the \ENTRY or \CONTINUE record.

** OVERFLOWS DIRECTORY.  REC= :  MAKECAT produces a directory for HELP
        catalogs to be placed in the user labels of the resulting
```

file. The original HELP catalog file is created with a default number of user labels for the directory--if more user labels are needed, a new catalog file is created. This error is reported if the directory cannot fit into the maximum number of user labels per file (255).

** UNABLE TO OPEN LARGER FILE
** UNABLE TO READ DIRECTORY
** ENLARGED DIRECTORY TOO SMALL
** COPYING ERROR (DIRECTORY)
** UNABLE TO 'REWIND' OLD FILE
** READING ERROR WHILE ENLARGING
** ENLARGED FILE TOO SMALL
** COPYING ERROR (FILE):  As mentioned above MAKECAT has to open a new file when it needs to enlarge the number of user labels for the directory. When this new file is opened, the information in the old file, both directory (user labels) and records, has to be copied to the new file. The old file is then deleted. These errors may be reported for situations in this operation.

** MISSING '\ALL' AT THE END OF HELPSET:  The \ALL record was missing from the end of the source file.

Refer to the System Manager/System Supervisor Manual for more information on running MAKECAT.

## KNOWN ERRORS IN THE HELP FACILITY

1. The  SUBSET facility does not work — the presence of a  SUBSET will render the rest of the catalog following the next  STOPHELP useless.
2. When MAKECAT cannot format a catalog for any reason, it should terminate in the error state (thereby setting the system-defined JCW to a value greater than FATAL).
3. As of this writing, HELPROC is not an intrinsic, but it is a system procedure that can be called from user mode. In order to call it, HELPROC needs to be declared as an EXTERNAL procedure. Here is an example of how to declare HELPROC:

```
PROCEDURE HELPROC( CFN, LFN, CIM, CBASE, ERR, PRMPT );
    VALUE    CFN, LFN, PRMPT;
    INTEGER CFN, LFN, ERR;
    BYTE ARRAY CIM, CBASE;
    LOGICAL PRMPT;
OPTION EXTERNAL;
```

4. The error reporting in MAKECAT should be improved.
5. HELPROC need falling-off-the-end-of-the-world checking to insure a carriage return in the byte array.
6. HELPROC should check that catalog was opened correctly.
7. HELPROC should only open $STDIN in subsystem mode.
8. HELPROC makes no check for split stack calls.
9. Listfile parameter is always ignored. All output goes to the caller's $STDLIST.

## SUMMARY AND CONCLUSIONS

The user may use HELPROC with a prepared catalog as a help facility for application programs. Catalogs are prepared with the HELP entry point of MAKECAT.PUB.SYS. In order to use this help facility, the user should
1. Create a source text catalog file in the documented format,
2. Prepare the catalog by running MAKECAT.-PUB.SYS,HELP and,
3. Modify the application program to
   a. Open the prepared catalog file,
   b. Call HELPROC,
   c. Optionally close the catalog file when done.

The Help Facility is designed to general and flexible. Use of MPE's Help Facility can be extended for application programs.