NULU.DOC
Documentation for NULU.COM
as of 10/01/84
Version 1.0

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This program would not have been possible were it not for the
elegant work of Gary P. Novosielski and those others working with
the LU library structure.

INTRODUCTION

NULU is offered as a complete replacement for LU and LSWEEP.
Weighing in at 14k, it includes nearly all features of both
programs and then some. It features:

        Two operation modes with a full menu for each
        Viewing and printing of member files, unsqueezing when
                necessary
        Extraction of member files with an option to unsqueeze
                where appropriate
        Bigger libraries, up to 800 members or more depending on
                available memory
        Automatic member sorting, all members kept sorted at all
                times
        Faster reorganization
        Enhanced error handling
        Access to deleted members
        Optional read only mode
        General compatibility with LU and NSWEEP syntax
        Numerous user patches

DIFFERENCES BETWEEN NULU AND LU

I am aware of only one thing that LU does that NULU does not do.
LU maintains a CRC for each member file and for the library
directory as a whole.   NULU doesn't do this at all.   In fact,
NULU changes these CRC bytes to 00 as soon as it gets the chance.
In case you still want or need to run LU on a library modified by
NULU, LU will simply regard it as a library created by an earlier
LU version and will promptly set CRC's for the various members.

NULU

To the best of my knowledge, NULU will run on any system running

CP/M 2.x or higher, however it has only been tested on the Osborne 1 and the Osborne Executive computers. It is written entirely in 8080 assembly language.

A complete discussion of the nature and advantages of library files is beyond the scope of my endurance, however a short recap is in order.

A library file is a single CP/M file which maintains 1 or more smaller files as its members. Each file is written into the library and recorded in the library directory. After that, it may be accessed for viewing, printing, or execution, or may be extracted from the library to assume the status of a stand-alone file once again.

The reasons for doing this are many. For one, under CP/M each file occupies a minimum amount of disk space. This amount can range from 1k to 16k, depending on the system. Even though a file may only be 1 byte in length, it will still occupy the minimum required amount; the rest of the space is wasted. Putting these files in a library minimizes the possible waste to 127 bytes.

Each file also occupies a directory entry. On most floppy disk systems, the maximum number of files per disk is 64. By including a file in a library the directory space it used to occupy is freed for another file.

Additionally, using library files can simplify the process of categorization by subsuming several files of similar types or subjects into one file.

However, there are also dangers associated with using libraries. The main one is that if a library file is lost or damaged, all of the member files are lost as well. The solution to this problem can be summed up in one word: BACKUP. NULU probably isn't perfect, and we all know that disk systems aren't, so backup your important libraries, please. I don't want to hear any sad stories.

Almost as important as backing up libraries is the use of discretion when deciding what to put into them. Let's face it, if a file is in a library it is not as easy to get to. If you need to get to a file every 15 minutes, it probably shouldn't be in a library except as a backup measure.

AN ASIDE CONCERNING FILESPECS

When specifying a filespec, wildcards may be used freely, however, unlike most programs, NULU doesn't insist that a "." separate the filename from the filetype. For example, the filespec "**" means the same thing as "*.*" to NULU. On the other hand, the filespec "FRED.TXT" should be typed in just like that. "FREDTXT" would make NULU think that no filetype had been specified. The rule is simple: use a dot any time you like, but it is only strictly necessary when it is needed for clarity.

When specifying a drive and/or user area the syntax is very liberal. "A15:**" means the same as "15/A:*.*", as does "1A5:**". The colon is absolutely necessary. If a different user area is desired for the default drive, the drive specifier may be omitted, as in "15:**", just as the user area may be omitted as in "A:**".

If a drive/user specification is made, but no filespec is
indicated, a filespec of ????????.??? is generated. Therefore to
indicate the default drive, current user area, and a filespec of
????????.???, just type a colon by itself (e.g., ":") !

NULU OPERATION

NULU may be invoked with or without a command tail. A command
tail can consist of any combination of valid NULU operators up to
128 characters (the limit imposed by the CCP. Once NULU is
running, command lines can be as long as 254 characters.)

As in LU, all NULU commands are preceded by a dash. This is a
copy of the menu for the command mode of operation:

        -A Add members   -B Brief toggle
        -C Close the library   -D Delete members
        -E Extract members   -F Filesweep mode
        -G Get filespec   -K Krunch the library
        -L List members   -M Menu
        -N Rename members   -O Open a library
        -P Print members   -Q Unsqueeze members
        -R Replace members   -T Replace/Add members
        -U Drive/User change   -V View members
        -X Exit NULU   -Y Disk directory
        -< Redirect input   -> Redirect output

Commands may be strung together, each terminated by a space.
They are processed left to right.   All characters are converted
to upper case.

The default drive/user area are displayed along with the name of
the current command mode each time the console is prompted for
input.

The commands will be explained in order of their appearance
above.   All items in [square brackets] indicate optional
parameters.   Filespec parameters enclosed in (parenthesis)
indicate references to deleted member files.   Three dots ("...")
after a parameter indicate infinite repetition.

COMMANDS

-A   ADD MEMBERS
        Syntax: -a filespec[filespec...]

        Use this command to add files from disk to the current
        library.   NULU will make a series of passes through the
        directory, adding files as it goes, until the list of
        matching files is exhausted. If matching filename
        already exists as an active member in the library, its
        name will be displayed and the file will not be added.

        In all file addition and replacement operations, if a
        deleted entry of identical size can be located, that
        disk space and directory entry will be used rather than
        allocating new space for the file.   This means that it
        will be necessary to reclaim wasted disk space less
        often.

-B   BRIEF TOGGLE

Syntax: -b

This toggles the prompting mode. The release version of
NULU is setup to print the full name of the current mode
for a prompt, as in "-ADD MEMBERS A0:>".   If BRIEF is
turned on the user will simply see "-A A0:>".   NULU may
be permanently patched to default to BRIEF ON or OFF.
See NULU MODIFICATION.

-C   CLOSE THE LIBRARY
          Syntax: -c

This command closes the current library, writing its
directory to disk if any changes have been made to the
directory.   The library directory is NEVER written
except when the library is closed, so be sure to do it.
If you forget to do so and remove the disk, NULU will
prompt you for the disk again and will attempt to
recover, but no guarantees!

Some other operations that cause the current library to
be closed are:
          -k, -o, -x

-D   DELETE MEMBERS
          Syntax: -d filespec[filespec (filespec)...]

Member   files matching the given filespec will be given
deleted status in the library directory, except when the
filespec is enclosed in parenthesis.   In that case
matching deleted members will be given active status.
That is, they will be undeleted.   If the filename of a
matching deleted member file already exists as an active
member, the filename will be displayed and the file will
not be undeleted.

-E   EXTRACT MEMBERS
          Syntax: -e filespec[=newfilespec filespec...]

Use this command to extract active member files.   If
extraction to the current drive/user area is desired, no
further syntax is necessary. To indicate another drive,
however, a destination filespec may be included
following an equals sign. Example:

-e **=a5:

would extract all active members to drive A, user area
5.   Files may be renamed as well as redirected by
indicating a filespec along with, or in place of, a
drive user specification. Examples:

1.   -e *asm=*bak
2.   -e *asm=5:*txt
3.   -e fred.txt=sam.txt jane.inf=c8:girls.dbf

The examples would produce the following results:

1. Extract all files with a type of .ASM to the default
drive/user renaming them with the filetype of .BAK.
2. Extract all files of type .ASM to user area 5 of the
default drive, renaming each with the .BAK filetype.
3.   Extract the member file FRED.TXT to the default
drive/user under the name of SAM.TXT, and extract the

member file JANE.INF to user area 8 of drive C: with the
                filename GIRLS.DBF.

                The only rule to remember is that if a destination
                filespec is entered it cannot be any less ambiguous than
                the source filespec.   That is, "*asm=*bak" is valid
                while "**=*bak" is not valid.

   -F   FILESWEEP MODE
                Syntax: -f

                This command places NULU in its second operational mode:
                the filesweep mode.   This allows the user to move
                through the directory of active member files as if they
                were individual files being examined by a program like
                NSWEEP.   The filesweep mode's command list is as
                follows:

                A Next member   B Previous member
                C Close the library   D Delete member
                E Extract member   L Log new library
                P Print member   Q Unsqueeze member
                R Rename member   U Drive/User change
                V View member   W Wildcard rename
                X Exit NULU   Y Disk directory
                Z NULU command mode   ? Menu

                Because of the extreme similarity between these commands
                and the commands of NULU's command mode, only a short
                description of each command will be given.

                A -- Advance to next member
                       (spacebar, cr, or lf will produce the same result)
                B -- Back up to previous member
                C -- Close the current library
                D -- Delete current member file
                E -- Extract current member file
                       (prompt allows redirection)
                L -- Logon to new library
                       (closes the current library)
                P -- Dumps the current member file to LST:
                       (unsqueezes if needed)
                Q -- Extract current member file, unsqueezing if
                             necessary
                       (prompt allows redirection)
                R -- Rename current member file
                U -- Change drive/user defaults
                       (returns file pointer to the top of the file list)
                V -- View current member file
                       (unsqueezes if needed)
                W -- Wildcard rename of members
                       (prompts for both oldname and newname)
                X -- Exit NULU
                       (closes all files)
                Y -- Get disk directory for default drive/user
                       (returns file pointer to the top of the file list)
                Z -- Return to NULU command mode
                       (current library remains open)
                ? -- Print the filesweep mode menu
                       (returns file pointer to the top of the file list)

                If, when the filesweep mode is entered, or after a
                library has been closed,   there is not a library
                currently open, the filesweep mode will prompt with:

No library open.

and will accept only the following commands:

L,U,X,Y,Z,?

Likewise, if a library is open but only has a directory
with no other active members, the message

No member files.

will be printed and only the commands listed above will
be accepted.

During the filesweep mode operation, each file will be
listed in the order in which it is found in the
directory, along with the size in K that the file would
occupy if it were extracted to the default drive.

If the filesweep mode is terminated by a return to the
NULU command mode, any commands that followed the -F
command on the previous NULU command line will be
executed.

-G   GET FILESPEC
        Syntax: -g filespec

        NULU will search for the filespec indicated. If it is
        found, processing continues. If not, the user is
        prompted to insert the disk containing that filespec.
        The drive is then reset and search again. The program
        will prompt forever until it receives the proper
        filespec or until a cntrl-c is entered, forcing NULU to
        continue without the filespec being found.

        This command can be useful when attempting to control
        NULU through a submit utility like DRI's SUBMIT.COM.
        For example, one might type:

        nulu -o a:asm -g b5:-work.005 -e **=b10: -g a0:-5.005 -x

        After loading, NULU would open a library called ASM.LBR
        on drive A: in the current user area.   Next it would
        search user area 5 of drive B: for filespec -WORK.005
        until it was found.   Then all active member files
        would be extracted to user area 10 of drive B:.
        Finally, NULU would search user area 0 of drive A: for a
        filespec called -5.005 until found. Then NULU would
        terminate. Notice here that the ASM.LBR didn't have to
        be closed before the search for the final filespec
        because no change had been made to the library
        directory.   If a change had been made, after the new
        filespec had been loaded, NULU would have demanded the
        disk with ASM.LBR back so it could update the directory.
        Therefore the GET operation would be effectively
        negated.

-K   KRUNCH THE LIBRARY
        Syntax: -k[<number of entries to allow]

        Even though all members are kept in alphabetical order
        at all times, when a member is deleted the disk space it
        occupies is not released to the operating system until

the KRUNCH command is executed.   KRUNCH consists of the
following steps:

1.   The library directory is re-sorted by sector index
number, that is, in the order in which the member files
actually exist in the library.
2.   The library is closed.
3.   A new library called WORKLBR.$$$ is opened in the
default drive/user area and the user is prompted to
input the number of files that the new library should be
able to contain.   If the user wants just enough entries
to contain the currently active members, the number 1 or
any number less than or equal to the current number of
active entries may be entered.   If the   optional
parameter listed above is entered, it will be used as
the number of entries.   (The KRUNCH processed may be
aborted here by typing RETURN or 0.   Please note that
the library directory counts as an entry and will
automatically be accounted for by NULU.)
4.   Once WORKLBR.$$$ is opened, the active member files
from the original library will be copied one by one into
the new library.   The copy routine uses a recursive
process to copy as many files at one time as possible.
5.   The old library is deleted and WORKLBR.$$$ is
renamed with the old library name.

Examples:
1.   -k
2.   -k <1
3.   -u b5: -k <63
4.   -u b5: -k <1 -u a0: -k <63

The above example would produce the following results:

1.   The library would be KRUNCHed to the default
drive/user area.   The user would be prompted to input
the number of entries to allow.
2.   The library would be KRUNCHed to the default
drive/user area with just enough entries to contain all
currently active member files.
3.   The default drive/user area would be changed to B5:
before the KRUNCH begins.   Then the library would be
KRUNCHed, allowing 63 entries.
4.   The default drive/user area would be changed to B5:
before the KRUNCH begins. The KRUNCH would commence,
allowing only enough entries to contain all active
members.   The drive/user area would be changed to A0:.
Then the library would be KRUNCHed again, allowing 63
entries.

-L   LIST MEMBERS
          Syntax: -l[filespec]
          Syntax: -l[(filespec)]

          Use this command to list the contents of the library
          directory.   Each member filename will printed followed
          by the starting relative sector number in the library
          file, the size of the member in sectors, and the size in
          K that the file would occupy if it were to be extracted
          to the default drive/user area. Finally, a recap of the
          size of all member files listed is printed, along with
          the number of sectors occupied by deleted files.

          The parameters listed above can be used to control the

selection of files for display. Examples:

1. -l
2. -l **
3. -l (**)
4. -l *asm
5. -l (fred.txt)

The above examples would produce the following results:

1. All active member files listed.
2. All active member files listed.
3. All deleted member files listed.
4. All active member files matching the filespec of
????????.ASM listed.
5.   All deleted member files called FRED.TXT listed.
(Note that is IS possible to have more than one deleted
file with the same name.)

-M   MENU
          Syntax: -m

          Print the command mode menu.

-N   RENAME MEMBERS
          Syntax: -n oldfilespec=newfilespec[...]
          Syntax: -n (oldfilespec)=newfilespec[...]

          This command is used to rename active or deleted member
          files.   Wildcards   are   fully   supported,   but   the
          newfilespec   can   be   no   less   ambiguous   than   the
          oldfilespec.   Deleted   members   may   be   renamed   by
          enclosing   the   oldfilespec   ONLY   in   parenthesis.
          Examples:

          1. -n *asm=*bak
          2. -n (fred.txt)=sam.txt
          3. -n **=**

          The above examples would produce the following results:

          1.   All   active   members   matching   the   filespec
          ????????.ASM would be renamed with a filetype of .BAK.
          2.   The first deleted member file called FRED.TXT would
          be renamed to SAM.TXT.   All other members matching that
          filespec would be listed along with a message indicating
          that they could not be renamed.
          3. All active member files would be listed, each with a
          message indicating that they could not be renamed
          because the name already exists.

-O   OPEN A LIBRARY
          Syntax: -o filename[<number of entries to allow]

          With the exception of the filesweep Logon command, this
          command is the only method to open or create a library.
          NULU will search for the filename indicated.   If it is
          found, it will be opened and a message will be displayed
          indicating the size of the Data Transfer Buffer.   This
          is the number of sectors in memory that NULU will have
          to use in extracting, adding or copying member files.

          If the file is not found, the user will be prompted for

the number of entries to allow in the new library.   If
          the optional parameter above is passed, the number will
          be used to determine the directory size of the library.
          All directories can contain some multiple of 4 entries.
          All numbers input will be rounded up to the nearest
          multiple of 4.   Remember that the directory itself
          counts as one entry and that NULU will automatically
          make space for it.

          The filename passed must be unambiguous.

          NOTE ON DIRECTORY SIZE:
          Depending on available memory, libraries with as many as
          1250 entries (theoretically) can be opened.   But watch
          the Data Transfer Buffer Size!   If it is less than 8
          sectors you will not be able to unsqueeze any files.

-P   PRINT MEMBERS
          Syntax: -p filespec[filespec (filespec)...]

          With this command, the ascii contents of member files
          matching the filespecs given will be dumped to the list
          device.   If the file is squeezed, NULU will unsqueeze
          it.   Deleted members may be listed by enclosing the
          appropriate filespec in parenthesis.

-Q   UNSQUEEZE MEMBERS
          Syntax: -q filespec[=newfilespec filespec...]

          This command is identical in operation and syntax to the
          EXTRACT command, except that if the matching members are
          squeezed, they will be unsqueezed.

-R   REPLACE MEMBERS
          Syntax: -r filespec[filespec...]

          This command is identical in operation and syntax to the
          ADD command, except that matching files will be added to
          the library ONLY if they already exist in the library.
          They will be deleted, then the new files will be added.

-T   REPLACE/ADD MEMBERS
          Syntax: -t

          This command is a combination of the ADD and the REPLACE
          commands.   If the files do not exist in the library,
          they will be added.   If they do exist, they will be
          replaced.

-U   DRIVE/USER CHANGE
          Syntax: -u new drive/user

          Use this command to change the default drive/user area.
          A colon (":") must follow the drive/user spec. Example:

          -u a5:

          would switch the default drive/user area to A5:.

-V   VIEW MEMBERS
          Syntax: -v filespec[filespec (filespec)...]

          This command will list the ascii contents of all member
          files matching the given filespec to the console device.

Deleted members may be indicated by enclosing the
filespec in parenthesis. If the member files are
squeezed, they will be unsqueezed. At each page, NULU
will accept one of the following commands:

1. Cntrl-x to skip to the next member file
2. Cntrl-c to abort further listing
3. L to list one line
4. CR, space, or LF to list another full page

At the end of each member file the message

 "Press RETURN"

will be displayed and NULU will wait for a keystroke
before moving to the next matching member file.

-X   EXIT NULU
          Syntax: -x["$$$.SUB command line"]

          This command will set a flag indicating that when the
          current NULU command line is exhausted, NULU should
          terminate. But the command is actually a toggle. If it
          is entered twice on a line the effect of the second
          issuance will be to negate the first. If the optional
          parameter is passed, it will be written to a file called
          $$$.SUB on drive A: in the user area that was active
          when NULU was first loaded. The line will be encoded as
          a SUBMIT command line recognizable by the CCP.
          Therefore, when NULU exits, the CCP will reach into that
          file and execute the line. (CP/M Plus users take note:
          the $$$.SUB file will be written to the drive that was
          the default drive when NULU was first loaded.)
          Examples:

          1. -x
          2. -x -x
          3. -x "nsweep b:"

          The above examples would produce the following results:

          1. The termination flag will be set and NULU will
          terminate when the current command line is exhausted.
          2. The termination flag is set and the reset. NULU
          does not terminate.
          3. The termination flag is set and a file called
          $$$.SUB is created on the appropriate drive with the
          command line "NSWEEP B:" encoded in it.

-Y   DISK DIRECTORY
          Syntax: -y[filespec]

          This command will print an unsorted directory of the
          disk indicated by the parameter passed, or a complete
          directory if none is passed. The scope of the directory
          may be limited by indicated the appropriate ambiguous
          filespec.

-<   REDIRECT INPUT
          Syntax: -< filename

          This command will cause NULU to open the filename
          indicated and begin accepting commands from it instead
          of receiving them from the console. This type of file

is, in effect, a NULU command file. Syntax of the
commands in this file is identical in every way to the
syntax used in normal NULU operation. Each command line
in the file must be terminated by a CR,LF. If another
"-<" command is encountered in the file, the current
command file will be closed and the new one opened.
After the commands have been completely processed,
control will be returned to the console. All command
lines will be converted to upper case and echoed to the
console before processing. Any commands appearing after
a "-<" command will be ignored.

The filename passed must be unambiguous.

->   REDIRECT OUTPUT
            Syntax: -> filename
            Syntax: ->

With the first form of this command, NULU output will be
sent to the filename indicated. If the file already
exists, it will be deleted. All special characters that
the user may have patched into NULU (see below, NULU
MODIFICATION) will be sent to the file as well, with the
exception of the EOF character, 26 (1ah). The only
output not echoed to the file will be output caused by
viewing or printing a member file.

The filename passed must be unambiguous.

Under the second form of this command, the current
output file, if any will be closed. When NULU is caused
to terminate, the current output file is closed along
with the current library, if any.

ERROR MESSAGES

All NULU error messages are of the form:

ERROR XX: Explanation

where "XX" is some number from 0 to 255 and "Explanation" is a
clue as to the nature of the error. Each error message is listed
below, along with an explanation. Suggestions about ways to
handle the error are given when appropriate.

ERROR 63: ambiguity error
Problem: This means that you entered an ambiguous filespec
                   where an unambiguous filename was required.

ERROR 68: disk full
Problem: The library disk became full during file addition
                   or KRUNCHing or the destination disk of an
                   extraction command became full.
Solution: If the error occurred during KRUNCHing, NULU
                   should have recovered by itself, reopening the old
                   library. If it did not recover, then you removed
                   the original disk before the KRUNCH was complete
                   or a serious read error occured.

                   If the error occurs during file addition to the
                   library, operation should not be impaired, but no
                   files that required additional disk space can be
                   added to the library. Note that deleted entries

can still be overwritten by incoming files as long
                    as the file sizes match.   The original file that
                    caused the error will be recorded in the library
                    directory as a deleted entry.

                    If the error occurs during file extraction or
                    unsqueezing the destination file is   deleted
                    because it is an incomplete file.   Extraction can
                    continue as before.

ERROR 73: invalid drive
Problem: An invalid drive for your system was chosen (see
                below, NULU MODIFICATION) or a letter higher than
                "P" was indicated.
Solution: Choose another drive or re-patch NULU.

ERROR 77: not enough memory
Problem: An attempt was made to open a library with a
                directory too large to be accounted for with
                available memory.
Solution: Open the library on a computer with a larger TPA
                and reorganize it so it can be handled by the
                smaller system.

ERROR 78: user cancel
Problem: No problem.   NULU is simply letting the user know
                why an OPEN LIBRARY or KRUNCH operation has been
                cancelled.

ERROR 83: no directory space
Problem: An attempt was made to create a file on a disk
                with no free directory entries.

ERROR 85: file not found
Problem: The filespec indicated for some operation could
                not be located.

ERROR 86: CP/M 2.x or higher required
Problem: An attempt was made to run NULU on a system with
                an CP/M version number of less than 2.0.

ERROR 88: seek to unwritten sector
Problem: A sector required to gain access to a file is
                indicated by CP/M to be unwritten.
Solution: The library directory or perhaps the library
                itself has become trashed at some point. Deleting
                the entry and KRUNCHing will probably render it
                harmless, but the safest course to take is to
                obtain a fresh copy of the library.

ERROR 100: bad library directory
Problem: The file specified could not be opened as a
                library file.
Solution: The directory could be bad, but most likely the
                file simply isn't a library.   Check it out with
                some disk editor like SPZ or EDFILE.

ERROR 115: bad syntax
Problem: Improper syntax was user to attempt some operation.

ERROR 116: squeeze decode table
Problem: A file has a squeeze decoding table, but at some
                point the table is trashed or perhaps is missing.
Solution: None really; get a new copy of the file.

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ERROR XX: undefined
Problem:        Unknown.
Solution:       Write  down  all  information  presented  on  the
                terminal.  The number following the word ERROR is
                especially important.  Get the information to  me.
                Mail it or call and I will try to help.



                        NULU MODIFICATION


Patches  will  be  listed in the order in which  they  appear  in
NULU.COM.   Each  patch is explained and the default  values  are
listed immediately next to the patch address.   All addresses are
absolute hexadecimal.

Patch     Default             Explanation
00171h     00h                Non-zero  makes  NULU use  the  Z80
                              instructions LDIR and LDDR for data
                              movement.
00172h     50h                Number  of  characters each   full
                              video  line  can   contain.    Not
                              necessarily  the same as the number
                              you can see.
00173h     50h                Number  of characters visible on  a
                              line at any one time.
00180h     10h                Number  of  contiguously  numbered
                              disk drives in your system.  If you
                              have drives A and B, set this value
                              to  2.   It  will prevent you  from
                              accessing an invalid drive.
001c5h     00h                Set  to  a non-zero value  to  make
                              NULU READ/ONLY.   No operators will
                              be  executed that could change  the
                              library directory in any way.
001c6h     00h                LU.COM  was  set  up  to  exit
                              automatically if a command tail was
                              used when LU was invoked.  With the
                              release  version of NULU,  it takes
                              the -X command to exit.   Set  this
                              byte to a 01h to get it to act like
                              LU  in this respect.   That is,  it
                              will  automatically   exit   after
                              executing the passed command  tail,
                              if one was present.
001c7h     01h                Set  to  a 00h to start  NULU  with
                              BRIEF  mode  ON (long messages  not
                              printed).
001c8h     00h                Starting here are 39 bytes in which
                              any  valid  NULU operators  may  be
                              stored.    This   line   will   be
                              automatically executed when NULU is
                              loaded,   even  before  any   other
                              parameters  passed  on the  command
                              line.  This might be used to create
                              a  version  of  NULU that,   after
                              loading,   sets   the   drive/user
                              defaults to B0:,  prints the  menu,
                              scans  the drive for library files,
                              then  switches to the open  library
                              mode.  That command line would look
                              like this:
```

```
                             -U B: -M -Y *LBR -O

                             Notice that all characters in  this
                             line  MUST  be  UPPER  CASE.   The
                             entire line MUST be terminated by a
                             null  byte.   Only 39  bytes  are
                             available  for  text...not  a  byte
                             more.   The  40th  byte is for  the
                             null terminator.
03103h      0ah              If  you  have  trouble  thinking  in
                             decimal,  you can change this  byte
                             to  get NULU to output all  numbers
                             in whatever base you please, from 2
                             to 24h (36d).
03825h     0005h             This  is  the address of  the  BDOS
                             vector.  All operating system calls
                             go  through this address.   If  you
                             have some weird,  non-standard CP/M
                             implementation  you can patch  this
                             to try to make NULU work with it.
03876h      3ch              This  is  the number of lines  that
                             NULU will print on each page during
                             member file printing.   Change this
                             value  in accordance with the  line
                             printer patch below.
```

Starting at 03848h are 6 data areas used to define strings needed
to control the console attributes.   Each string is preceded by a
byte indicating its active length.   Then 5 bytes are available
for each definition.   Therefore a total of 6 bytes is consumed
for each video control. The attributes are, in order:
     DIM or REVERSE VIDEO ON   (DIM is preferred)
     DIM or REVERSE VIDEO OFF
     UNDERLINING ON
     UNDERLINING OFF
     CURSOR POSITIONING (not used in NULU)
     CLEAR SCREEN

Each control becomes active as soon as it is patched in.

Likewise, there is one string defined for the LST: device that
will be issued immediately before printing a file.   It begins at
038adh and has the same format as the strings above.

                            FINAL NOTES

Please report any bugs or problems to Martin Murray, P.O. Box
35972, Dallas, Tx 75235 or call (214) 351-6117.

Donations will be gratefully accepted.   It took a lot of work to
produce NULU and if you enjoy it and it benefits you, don't
hesitate to show your appreciation with a check!