
Manual for LHA Version 2.13

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This is a manual for the public release of LHA.EXE.v 2.13. LHA is an upward compatible and improved version of LH Ver 1.13C. Since Microsoft's DOS 5.0 now has an interior command LH (for Load High), the name has been changed from LH.EXE to LHA.EXE.

0. To begin with

This is a revised version of LH113c.EXE, an archiver which was rather slow in execution but tight in compression rate. I am grateful for the support of LH113c's users both in Japan where the .LZH file is a standard archived file name and in other countries where .LZH has become well-known and used often. I have been working on this new version for two years since the last release of LH113c.EXE. I am now glad to announce the release of LHA. I am constantly upgrading upon user's report on bugs and on new requests.

LHA differs from LH113c:

LHA is better than LH Ver 1.13 in compression rate, especially with large files. There are a few exceptions if using rather small files. (Under 1 Kb.) LHA is faster than LH113c in decompressing, with new static Huffman coding, compared with the older dynamic Huffman. The speed of compression is not as fast as I was expecting. <Sigh>

LHA needs more memory than LH113c did. If there is not enough for LHA to work, it may have looser compression rate, although it tries to continue execution. LHA is upward compatible with LH113c. But LH113c is not completely compatible with the LHA format. Please switch from LH113c to LHA as soon as you can. With the "/o" option, you can make archives dearchivable by LHarc Ver 1.xx - otherwise LHarc will complain for "unknown method".

refer to our distribution policy.

You can now proceed to read the complete description of commands and options. However, if you are not familiar with what an archiver is, please refer to the introductory note LHA.HLP written especially for LHA.EXE by late Irvin Hoff.

1. Usage

A. General Format:

LHA <command> [/<option> ARC [[DIR\] [FILE]...]... [-+012|WDIR]...]

<command>: if one is not used, you get the help screen or a list of FILE(s).
<option>: you may supply one or more of options explained below. (needs an / or - in front, to designate an option)

ARC: archive name.
DIR: base directory name.
FILE: File name or full pathname if specified.
WDIR: Working Directory name.

B. <command>

a (Add) compress and add to an archive.

Compress and Add files specified to an archive. If the named archive does not exist, then create one with the name. LHA overwrites any file in the archive by the given file name with 'a' command. Compare with 'u' command.

The commands 'a' and 'm' are used to make an archive.

< Example 1 > LHA a EX *.EXE

LHA makes an archive named EX.LZH from all the files with extension 'EXE'. Extension .LZH is default.

u (Update) Compress and Update.

Compress and add files specified to an archive as command 'a'. If LHA detects a file with the name same as the one in the archive, then LHA selects the new one to add to archive, by comparing the time stamp of each.

< Example 2 > LHA u EX *.C

All the FILE(s) with extension '.C' are archived in EX.LZH.

If you already have an SX.LZH containing a FILE with the same name, only the one with newer time stamp is archived.

m (Move)

Compress and add to an archive as 'u' command with checking time stamps. The difference is that LHA deletes all the files moved into the archive.

< Example 3 > LHA m EX *.C

does the same as

```
LHA u EX *.C
del *.C
```

Watch the second line. With the /C option, LHA removes all the FILE(s) into the ARChive ignoring time stamps. You may lose the one with the older time stamp.

f (Freshen)

LHA looks for a FILE with the same name as the FILE in the archive. If it finds one with a newer time stamp, LHA rewrites the one in the archive. 'LHA f /c ARC ' will not check the time stamp.

< Example 4 > LHA f EX LHA.DOC

You have LHA.DOC compressed and archived in EX.LZH. You get a new LHA.DOC, then you replace the one in the ARChive, also.

d (Delete)

LHA deletes a file (or files) in the archive.

< Example 5 > LHA d ex lha.doc

LHA deletes lha.doc in the ARChive ex.LZH.

e (Extract)

LHA extracts FILE(s) from the archive with decompressing. If LHA finds a FILE in the archive with a newer FILE on the same DIR and having the same name, it skips that FILE(s). LHA extracts FILE(s) from ARChives made by L113C, namely, those with the compression ids -lzs-, -lz4-, -lz5-.

<Example 6 > LHA e EX

Extracts all the FILE(s) in the archive 'EX.LZH'.

< Example 7 > LHA e EX *.COM

LHA extracts all the files with extension .COM from 'EX.LZH'.

x (eXtract) LHA eXtracts compressed FILE with pathnames.

If LHA can not find any path, then it will create directories. FILE(s) must be archived with full-pathnames. LHA restores the entire directory structure. 'LHA e /x1m1 ARC' does the same.

< EXample 8 > LHA x EX

Suppose '\BIN\CG86.EXE' were among the FILE(s) in 'EX.LZH'. LHA creates directory '\BIN' if necessary, and extracts 'CG86.EXE' there.

p (Print) Print FILE on standard out.

LHA prints FILE decompressing from ARC to standard output.

< Example 9 > LHA p ex lha.doc

LHA extracts 'LHA.DOC' from 'EX.LZH' and displays it on your terminal.

< Example 10 > LHA p EX LHA.DOC > prn

LHA extracts 'LHA.DOC' from 'EX.LZH' and prints it out from your printer.

l (List)

LHA lists FILE names in the archive on a line. A FILE with pathname will have a mark '+' on the head of the line. 'LHA l /x ARC' shows full-pathnames of FILE(s) in ARC, and in 2 lines per FILE. You need not type 'l' to have the list.

<Example 11> LHA LHA213.EXE

LHA assumes command 'l' and shows list of FILE(s) archived FILE per line.

< Example 11x > LHA /x LHA213.EXE

You get a similar list but full-pathnames are inserted, and each FILE is shown on two lines.

NOTE: Forward slash '/' is used as the pathname separator.

v (View)

'LHA v ARC' is the same with 'LHA l /x ARC'.

t (Test)

Check the integrity of ARC, by CRC check.

LHA t LHA.EXE or LHA t LHA213.EXE

will announce the authenticity of the file you own.

LHA t LHA.EXE

"This file seems to be ORIGINAL distributed from H.Yoshi."

LHA.EXE tests itself for you. This guarantees the version you have is not hacked by anyone, though it is not the full guarantee in the present state of art. You can't check LHA.EXE if you have used executable file compressors such as LZEXE, PKLITE or DIET.

< Example 12 > LHA t EX

LHA tests integrity of the FILE(s) in 'EX.LZH'.

< Example 13 > LHA t LHA.EXE

LHA checks if LHA.EXE is the original file distributed.

It has often been asked that files made by LHarc v 1.xx fail this test. You cannot test LHARC.exe with this test. If you get an answer "file corrupt", don't get panic. These files often have extra padding in the back of the file.

s (Self-extract)

LHA makes a Self-Extracting archive from ARC.LZH. The default switch /x0 is assumed when you do not specify. SFX made with the /x0 switch, small model, extracts files on the current directory. You can't activate some programs in the archived FILE(s) automatically with small model. The size of the SFX file is smaller than those made with /x1 switch, large model.

The large model SFX has the ability to restore subdirectory structures and can automatically start execution from a FILE inside the archive.

< Example 14 > LHA s EX

In this case, LHA makes a small model EX.EXE from EX.LZH.

We had many inquiries that LHA does not make SFX file. You must first make LZH file by 'a' or 'm' command. Then you use 's' command to make it a self-extracting file.

C. </option>
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Each option takes 3 numerical values to define its finer actions. Use 0,1 and 2 to specify. For some options, the values 1 and 2 does the same thing. You may toggle 0 and 1 by '+' and '-" as with LH113c. You may change switch character (option) from / to - if you prefer the '-'.

/x[0|1] (eXtend)

LHA uses eXtended FILE names, namely full-pathnames for FILE(s).

You are on the root directory. Suppose you want to archive the FILE '\tc\include\sys\stat.h' in an archive 'ARC.LZH'. You type 'LHA a /x1 ARC.LZH \tc\include\sys\stat.h' to store the FILE with full-pathname,'\tc\include\sys\stat.h'. Similarly, you have a 2-lined list with full-pathnames with 'l' command.

/p[0|1|2] (Precise)

Search file names precisely.

Suppose an ARChive 'TC.LZH' contains both 'STAT.H' and 'SYS\STAT.H'. A simple command like 'LHA e TC stat.h' will extract both files on the current directory and let one override the other. To avoid such confusion, you can type 'LHA e -p TC stat.h' to extract 'STAT.H' only. While by typing 'LHA e -p TC sys\stat.h' you will get 'SYS\STAT.H'.

/c[0|1|2] (ignore Comparison of time)

With commands 'u', 'f', 'e', 'x', LHA ignores the checking of time stamps. With these commands, LHA chooses the newest FILE with the same pathname to act on, by default. This option lets LHA ignore the time stamps.

/m[0|1|2] (no Message)

The switch '/m1' let LHA assumes answer 'Y' for all the queries. "LHA e /m1 ARC" will extract files in ARC.LZH wherever "Y" is typed for the queries "Overwrite? [Y/N]" are asked. If there is a file in the directory with the same name but with attribute read-only, LHA reports 'file creation error'. Similarly LHA creates new directory if it meets 'Directory DIR does not exit. Create [Y/N]'.

On the other hand, with '/m2' switch LHA acts differently. 'LHA e /m2 ARC.LZH FILE' dearchives every FILE by choosing an unused file extension among 000-999, when LHA finds FILE(s) with the same name as in the ARChive.

/a[0|1] (any Attribute)

This switch enables LHA to archive FILE(s) with any attributes.

In the process of archiving with default switch /a0, LHA will not archive FILE(s) with hidden and system attributes. FILE(s) with read-only attribute is archived with the attribute. With this switch on, '/a1', FILE(s) of any attribute are archived

In the process of dearchiving, with /a1, dearchived FILE(s) preserve their original attributes. With /a0, you can't dearchive files with hidden and system attributes. Read-only FILE(s) are dearchived deprived of their original attribute.

/r[0|1|2] (Recursive)

LHA archives and extracts files recursively from subdirectories. 'Recursively' means LHA searches all FILE(s) from all subdirectories under the specified directory if there is any.

There are three different modes for the '/r' switch.

/r0: (non-recursive mode, default)

LHA collects files specified by path names only.

/r1:

LHA separates the given pathname into a directory name and FILE name. LHA recursively collects FILE(s) with the given name from all the directories under the directory specified.

< Example 15 > LHA a /r1 SOURCE.LZH \SOURCE.C\SOURCE*.H

LHA collects FILE(s) with extension C and H from the directory \source and its subdirectories, probably '\SOURCES\SAMPLES*.C' but not '\SOURCE*.OBJ'.

/r2:

LHA recursively collects all the files from all the specified subdirectories. Tree structure of the specified directory is archived as it is.

< Example 16 > LHA a /r2x1 a:*.*

NOTE: LH113c has set /x whenever /r is set in 'e' or 'x' commands. LHA differs from LH113c in that /x is not set with /r automatically.

The following questions are the most frequently asked ones:

(1) How do you backup a disk a: ?

```
LHA a /r2x1 LZH a:\
```

(2) Then how do you retrieve all the directories and files on b:?

```
LHA x ARC.LZH b:\
```

/w[0|1|<Directory Name>] (Work directory)

Specify the directory name where LH makes temporary files.

```
LHA a /wd:\  ARC.LZH FILE(s)
```

set -w switch on.

By default, LHA makes all the temporary files on the directory where ARC.LZH is to be made. It will rename the temporary file as ARC.LZH.

LHA makes temporary files on the current directory if no name is specified with '/w+'.

When you set Environmental variable 'TMP' this switch is set automatically to be 1, and you have the directory set by 'TMP='. as your working directory.

The switch helps LHA when you have not enough room in your base directory, or when you have a high speed memory device like RAM disk or HARD ram.

/t[0|1] (Time stamp)

With command a,u,m,f,d reset time stamp of ARC.lzh according to the newest file in the archive. By default, the time stamp of an ARC.LZH is the time when the ARC.LZH is made.

/z[0|1|2] (Zero compression)

LHA makes an archive without compressing.

/z1: None of the FILE(s) is compressed

/z2: Compress and archive except for the FILE(s) with extensions:

.ARC, .LZH, .LZS, .PAK, .ZIP, .ZOO.

/z<extension>: Do not compress FILE(s) with the specified extension. This switch assumes /z2. You may use wild card to

specify, and you may or may not put '.' in front of the extension. With '/zdbf' you don't compress FILE(s) with extension '.DBF'. With '/z' you will not have FILE(s) with no extension compressed. You may specify multiple extensions by writing sequentailly:

LHA a /ZCOM /ZERO ARChive.LH *.*.

/o[0|1] (Old compatible compression)

LHA makes an archive compatible with the LH113c format. Even in this case, LHA makes tighter compression than LH113c ver 1xx. The header id is automatically set to -h1.

/h[0|1|2] (Header level)

Choice of header level, default is /h0.

/i[0|1] (don't Ignore case)

Recognize Upper and Lower cases. LH(arc)s have common header format in other OS's where cases are recognized as distinct. This option is prepared for dearchiving archives made by other OS'. In the DOS version of LHA, you can't differentiate upper and lower when LHA archives FILE(s) into the archive. Names are all stored in upper case.

/n[0|1|2] (No indicator)

In this version, LHA outputs compressing indicator "ooo....." to standard error. The switch is to suppress this output.

/n1: LHA disables output "ooo....." to indicate its progress.

/n2: LHA disables outputs of filename, compression rates.

/l[0|1|2] (Long display).

LHA outputs filenames in different formats when LHA archives and dearchives.

/l0 : FILE names only.
/l1 : Full-pathnames stored or to be stored in archive in 2 lines.
/l2 : Full-pathname of FILEs accessed by LHA in 2 lines.

< Example 16 > LHA a /r1x1l2 LINK.LZH c:\LINK.*

LHA collects LINK.* with full-pathname from directories below c:\, with information from where LHA gets this FILE(s).

/-[1|2] (The first letter switch).

LHA recognizes the characters '-' and '@' as the first letter

of a FILE name. By default, any file beginning with '@', like '@xxx' is recognized as a Response File 'xxx'.

With
'/-1' switch LHA reads '@' as a character in the file name, while with switch
'/-2' LHA recognizes both '-' and '@' as characters.

To exit from this mode specify '/-[0]'. You cannot use '--0' in this particular case. LHA believes '--0' as a file name.

/s[0|1] (refrain from "Skipped filename.ext" message).

When LHA finds a file with the same name with newer time stamp, LHA skips decompressing a file from an ARChive. This message may cause some confusion in Batch mode execution. You may suppress the display. New from this version 2.13.

D. Base Directory.

Base directory is not the current nor the root directory. It is the directory on which LHA is executed. Or you may believe that you move to this directory and execute LHA from there. You may specify a number of directories as your base directories.

< Example 17 > LHA x program c:\BIN\ *.EXE *.COM c:\TEMP\ *.MAN *.DOC
~~~~~~~ ~~~~~~~~

Suppose you are on the directory d:\. You want to extract files with extensions .COM and .EXE on c:\BIN, and those with extensions .MAN and .DOC on the directory c:\TEMP. This is equivalent to the following set of command lines:

```
D>C:
C>CD \BIN
C>LHA x D:\program *.COM *.EXE
C>cd \TEMPp
C>LHA x D:\program *.MAN *.DIX
```

Naturally, you can't dearchive a single FILE on multiple directories. The directory specified first has the priority.

E. DOS redirection and response file

LHA can't accept too many file names on a command line due to MS-DOS's restriction. To avoid this inconvenience, LHA now accepts PIPES and REDIRECTS of DOS. Besides, LHA can use work file called response file to record the names of the files to be archived like MAKEFILE for some compilers.

a. Response File.
~~~~~~~

The response file name will be marked with the letter '@' as of LINK.EXE, which is a text file. You may just write whatever you want LHA to be done on this file. Response file ignores CR code and uses space as a separator. You may write options in the response file but you can't nest, calling other response file, file names.

b. DOS Pipes and Redirects.

You may specify the same information supplied by a response FILE by using pipes or redirections. You may create a response FILE by redirection.

< Example 18 > LHA l /n1 PARTS > FILE(s)
LHA a NEWPARTS @FILE(s)

Make a list of files in the 'PARTS.LZH' archive and use it to make a new ARChive 'NEWPARTS.LZH'. This is done by using the response files, after some editing.

< Example 19 > LS | SORTR | LHA a ALL ls -c | LHA a ALL

Make a list of files in a directory by LS.EXE. Sort file names and make a sorted archive ALL.LZH. Beware of the various formats from output of LS.EXE. LS.EXE is supposed to list files one name per line without any attributes or time stamps. LS designed after UNIX will do the trick by "ls -c" or "ls -C". C or c stand for "sorted by columns".

F. Environmental Variables

a. LHA and LHARC

LHA overrides LHARC. This will reset default optional.

b. TMP

Set working directory as -w option. In case LHA recognizes no working directory, it uses the current directory as the working directory and creates temporary files on it.

c. TZ

The time zone (EST, PST, etc.) must be set when you archive with the header level -h2- and when you dearchive with -h2-. In the Eastern Standard Time zone you have to set TIME ZONE with the DOS command: set TZ=EST+5. Remember the default Remember the default header level is -h1-, in which case you are all set.

G. Exit Codes.
==========

LHA will return following result codes after batch or other processes' execution.

0. Normal.

1. CRC error occured, probably with 'e','x','t' commands. Or LHA failed to create files because of disk space, or because of files in existence.

2. Fatal error. Process terminated without transactions.

3. Failed to write temporary files in the archive. You may find a temporary file LHTEMP)2(.LZH on your working directory. You may rename this file with extension LZH, and use it as an archive.

H. Working File Names
==========

LHTMP)1(.LZH : Old ARChive renamed.
LHTMP)2(.LZH : Working file to be renamed as ARChive.

2.SFX, Self-Extracting archive

General Usage:

SFX.EXE [/x] [/!] [/eDIR] [DIR]

/x: do not create new directory.
/!: auto-execution batch enable.
/a: restore file attributes.
[/eDIR],[DIR]; specify directory to extract.

SFX.EXE is an executable file with FILE(s) stored in the archive to be automatically extracted by execution. All the LHA distribution will be in the Self-Extracting (SFX) .EXE-format. Only LHA.EXE makes SFX files from archive *.LZH made by LHA.EXE. You can't make a Self-Extracting executable file from the archive made by 'LH113c.1.xx'.

LHA makes two models of SFX files: (a) the small model and (b) the large model according to the switch /x0 or /x1, with the following special functions.

A. Telop.
=========

LHA displays any file with name '!' if SFX.EXE finds it archived. LHA holds one screen after showing [Y/N] prompt. LHA proceeds to execute if it receives 'Y'. It quits (aborts) execution for 'N'. (The '!' character was used as it is the first printing character. A file starting with '!' will always be the first file in that archive.)

B. Directory Specification.
==========

This is possible only for the large model. You can name the directory on which to execute SFX.EXE.

< Example 20 > LHA213.EXE c:\user

LHA extracts FILE(s) in LHA212.EXE on C:\USER. You may of course type:

LHA e /x0 LHA213.EXE c:\user ,

to keep the TELOP file.

C. Auto Execution
==========

This is possible only for large models.

Archive a batch file with the name "!.BAT" and include it in the SFX file. This batch works if and only if you type:

LHA213 /!

LHA always extracts files on the current directory. Any existing "!.BAT" file is overwritten. You can't activate an existing !.BAT by using the "/!" switch even if there is one on the current directory. The batch file is read if and only if it is archived in the SFX file.

Two Models of Self-Extracting files are available:

a. Small Model (LHA s SFX.LZH)

This is the default model.

LHA ignores the directory structures even if you make the archive file with the /x or /r[1|2] switch. LHA holds only the FILE names. SFX.EXE extracts files to the current directory.

There is no limit on the size of SFX.EXE as there was for LH113c.

b. Large Model (LHA s /x1 SFX.LZH)

You can run a batch file to specify the directory to extract files. You can retrieve original directory structures with this model. You may refrain from creating unexpected structures by using the /x switch.

3. Main Differences from LH113c

LHA is an improved version of LH113c in principle. You will notice a number of differences between the two, when comparing. Some of the differences will be mentioned at this time. (You may wish to read the LH113c manual for a better comparison if anything appears confusing.)

FILE names are not sorted when entered into an archive. They are entered in the order in which they appear in the directory, when using wild cards. (This is different from LH113c.) If you specify the order of FILE, then the order is reproduced in the archive. If you add new FILE(s), they will be added at the end of the existing files.

There are external utility programs by other authors which you may use to sort the FILE names in your directory prior to adding them to the archive. Some programs actually resort the archive itself. Few include LH113c archives as LH113c already sorted those. LHA210 doesn't. By using a 'pipe' you can type:

< Example 21 > LS *.C *.H | SORT | LHA a EX.

LHA collects FILE(s) with extensions C and H sorted in the archive named 'EX.LZH'.

With LHA, the /r switch does not necessarily activate the /x switch in extraction. In this version of LHA, the 'x' command is equivalent to using 'E /x1m1', namely, LHA restores all the tree structures of subdirectories.

LHARC executed an AUTOLARC.BAT file by key word upon self-extracting. LHA no more uses keyword comparison. If a SFX file contains an !.BAT file, the batch is activated by '-!' following the executable file name.

The time stamp of LHA is relatively counted from 1970-01-01, 00:00:00 UTC by seconds. You must be careful not to set date or time which is illusory, like 00-00-00. LHA will display some indefinite date from overflow of the counter.

4. Our distribution Policy

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[74100,2565] on Compuserve,
K.Okubo Genie,
c00236@sinet.ad.jp. INTERNET,CSNET etc.

6. Acknowledgments

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1. LSI-C86 ver 3.20 evaluation copy, from LSI Japan.

2. A-MACROS /Structured Assembler Macros, from AMSCLS.INC (c) Hortense S. Endoh 1986,1987 ver.2.10. I appreciate the public distribution of these excellent softwares.

What have I done in these days of rapidly changing software technologies? My LH113c has contributed for the improvements of similar products such as PKZIP(tm) and PAK(tm). Even with my modest Japanese estimate, I can be proud of this achievement at this time. I thank all those people who supported and used LH113c - voices of users have always been a constant encouragement to me.

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