

1541 FLASH!™



MegaCommand
Kernal



Skyles Electric Works

$$2.44 \times 10^{-10}$$

$$10.2 \times 10^6$$

$$\begin{aligned} \frac{1}{4} \left(\frac{1}{2} \right)^{100} &= \frac{1}{4} \left(\frac{1}{2} \right)^{100} = \frac{1}{4} \left(\frac{1}{2} \right)^{100} \\ \frac{1}{4} \left(\frac{1}{2} \right)^{100} &= \frac{1}{4} \left(\frac{1}{2} \right)^{100} = \frac{1}{4} \left(\frac{1}{2} \right)^{100} \end{aligned}$$

1541 FLASH!

MEGACOMMAND KERNAL

INSTRUCTION MANUAL

by

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Introduction

Skyles Electric Works warrants the 1541 FLASH! MegaCommand Assembly parts and labor for 4 months from date of purchase. Please take a moment now to fill out and return the postpaid warranty card.

Installation instructions start on page 29 of the original 1541 FLASH! manual. They are at the end of the manual, because they are used only once, and then hopefully forgotten. Please turn to page 29 and start enjoying your 1541 Flash! MegaCommand.

Starting on the next page is a quick reference card covering all the commands added by the 1541 FLASH! MegaCommand Assembly.

ENJOY

1541 FLASH!

QUICK REFERENCE

Description of Symbology

Capital letters refer to keys struck in sequence.

<CTRL> refers to a single key struck

<SHIFT><RUN/STOP> strike two keys simultaneously

<RET> strike "RETURN" key

Command

Performs

Easy Everyday/DOS-Wedge Commands New

- 1: <C=><RUN/STOP> LOAD":*".8.1
- 2: <SHIFT><RUN/STOP> RETURN-RUN-RETURN
- 3: <↑> <RET> "name": PRG Load/Run "name"
- 4: <%> name <RET> LOAD "name".8.1
- 5: </> name <RET> LOAD "name"
- 6: <↑> name <RET> LOAD/Run "name"
- 7: <←> name <RET> SAVE "name"
- 8: <=> name <RET> VERIFY "name"
- 9: <!> <RET> Enter monitor
- 10: <!> <RET> XC <RET> Reset C-64
- 11: ?Q <RET> Turn off DOS
- 12: SYS 65526 <RET> Turn back on DOS

Easy Everyday/DOS-Wedge Commands Original

- 1: LOAD "PRG <RET> LOAD"PRG".8 <RET>
- 2: SYS 65526 <RET> Turn on DOS Commands
- 3: SYS 64738 <RET> C-64 reset
- 4: POKE 148.64 <RET> C-64 to slow load
- 5: Manual Sw CableCard Switch fast/slow
- 6: POKE 148.0 <RET> C-64 to FLASH!
- 7: ?28S <RET> 1541 to slow load
- 8: ?28F <RET> 1541 to FLASH!
- 9: ?UJ <RET> 1541 soft reset
- 10: ?IO <RET> Initialize Drive 0
- 11: ?# <RET> READ Directory
- 12: ?#:???* <RET> Dir. with pattern
- 13: ? <RET> READ Error Channel
- 14: ?#x <RET> Change drive number
- 15: %PRG NAME <RET> LOAD program without relocation/end links
- 16: ?RO:NEW=OLD <RET> RENAME a file
- 17: ?CO:NEW=OLD <RET> COPY a program
- 18: ?SO:NAME <RET> SCRATCH a File
- 19: ?NO:NAME.ID <RET> NEW a Disk
- 20: ?VO <RET> VALIDATE a diskette

(note: '?' and '>') are interchangeable)

1541 FLASH!

QUICK REFERENCE

Command	Performs
Editing Commands New	
1: <CTRL><2><RESTORE>	Set grey background
2: <CTRL><CLR/HOME>	Clear below cursor
3: <CTRL><INST/DEL>	Clear rest of line
4: <C=><RESTORE>	Enter NOTEPAD
5: SYS 61662	Enter NOTEPAD
6: <SHIFT><CLR/HOME>	Erase NOTEPAD
7: <←> <RET>	PRINT NOTEPAD to IEEE serial printer
8: <RET>	Exit NOTEPAD
9: <RUN/STOP><RESTORE>	Recover "crashes"
10: SYS 61656 <RET>	Enter FLASHMON!
11: <C=>	Enter FLASHMON! on RESET
12: SYS 61659 <RET>	PRINT screen to IEEE serial printer

Editing Commands Original

1: <CTRL><←>	Cursor to bottom of screen
2: <C=><←>	16 Character tab
3: <C=><↑>	Escape Quote mode twice for Insert mode thrice re-enter Quote
4: <C=><*>	CHR\$(27) in strings
5: <CTRL>	Slows Listing speed
6: <SHIFT><LOCK>	Pauses listings
7: <SHIFT><RETURN>	Return without line execution

Advanced Disk Programming Commands

1: 21b+CHR\$(t)+CHR\$(s)	"U1" replacement
2: 22b+CHR\$(t)+CHR\$(s)	"U2" replacement
3: 23b	High Speed Transfer data from buffer to C-64
4: 25b+CHR\$(t)+CHR\$(s)	Execute 21 then a 23
5: 26b+CHR\$(t)+CHR\$(s)	Linked loader
6: 27s	Speed set
7: <CTRL><RESTORE>	Enter NMI debugger
8: NMI Debugger	Run time debugger

QUICK REFERENCE

Command	Performs
FLASHMON! Commands New	
A: <I> <RET>	Enter FLASHMON!
B: SYS 61656 <RET>	Enter FLASHMON!
C: <C=> on powerup	Enter FLASHMON! without RESET or Cartridge start
1: M ssss eeee <RET>	List memory from ssss to eeee
2: I ssss eeee <RET>	List screen code from ssss to eeee
3: <: > ssss xx xx <RET>	Write memory from ssss
4: <: > ssss ABCDEF <RET>	Write with screen codes from ssss
5: G ssss <RET>	JMP to location ssss
6: <SHIFT>G ssss <RET>	JSR to location ssss
7: T ssss eeee nnnn <RET>	Transfer ssss-eeee to nnnn
8: T ssss eeee-1 ssss+1 <RET>	Write contents of ssss from ssss+1 to eeee
9: L "NAME" <RET>	LOAD "NAME"
10: L "NAME" ## ssss <RET>	LOAD "NAME" from ## into memory at ssss
11: V "NAME" ## ssss <RET>	VERIFY "NAME" from ## against memory at ssss
12: S "NAME" ## ssss eeee+1 <RET>	SAVE "NAME" on ## from memory ssss to eeee
13: <#> 12345 <RET>	Convert decimal to hex
14: <\$> hhhh <RET>	Convert hex to decimal
15: <>>	DOS-Wedge access
16: <?>	DOS-Wedge access
17: <SHIFT>G f0db <RET>	PRINT screen to IEEE serial printer
18: <C=><RESTORE>	Enter NOTEPAD
19: <CTRL><RESTORE>	Enter NMI debugger
20: X <RET>	Exit FLASHMON! warm start
21: XC <RET>	Exit. RESET C-64

Notes:

ssss, eeee, etc	:Represent hexadecimal numbers
##	:Represent device numbers
\$02a7-\$02aa	:Storage for SR.A.X.Y respectively
\$02ac	:Address of input vector

Symbology

We have adopted the following symbology for all the commands used in this manual.

First you should note that all the keys on the Commodore 64 have upper case letters on their top surface. We refer to all the keys therefore with upper case (capital) letters. If we wish you to strike a series of keys in sequence like normal typing we present the the sequence as follows:

If you should type "load" we show LOAD without any quotes or brackets.

Spaces between typing letters are for clarity only. SYS 65526 is exactly the same as SYS65526 to the Commodore 64.

If you should strike a function key such as "run/stop" we show <RUN/STOP> with brackets. We have abbreviated "return" to <RET>.

If you should strike two function keys together we show <SHIFT><RUN/STOP>

If you should strike two function keys one after the other we show <C=>, <CTRL>. WE use both a comma and a space between keys.

Preface

The 1541 FLASH! manual that accompanies this manual contains 20 Easy Everyday/DOS-Wedge Commands that also apply to the MegaCommand Assembly. Please go to page 6 of the 1541 FLASH! manual and read about these commands. There are 12 additional commands on the following pages.

The "DOS", or as they are sometimes called, "wedge" commands are a set of minimum keystroke commands for controlling the disk drive. Commodore furnishes a DOS program on the 1541 demonstration disk that accompanies the Commodore 1541 Disk Drive. This program occupies a small part of your computer memory and sometimes interferes with programs. 1541 FLASH! has a DOS program built in. This means that there are no programs to load or fill up memory. These DOS commands work with any Commodore 1541 disk drive with or without 1541 FLASH! installed.

The major keystroke saving that DOS offers is that the sequence of keystrokes;

OPEN 1,8,15," is replaced by a single keystroke; <@> or < > >.

The alternate command the "greater than" symbol was initially favored and gave the name "wedge" commands to the original DOS program. On the Commodore 64 the ">" requires two simultaneous keystrokes. We recommend that you use the "@" instead.

The DOS wedge is now enabled at powerup. No more 'SYS 65526'! It is no longer a true wedge, but rather traps the crunch tokens vector. You may need to turn off the wedge with the quit command '@q' before using some software.

Easy Everyday/DOS-Wedge Commands

Command <C=><RUN/STOP>

Command <SHIFT><RUN/STOP>

These two commands replace the longer command; `LOAD ":",8,1 <RET>`. Almost all commercial software will load with these command. This pair of commands loads the first program on the diskette in the 1541 Disk Drive. If the program you wish to load is not the first one on the diskette, use one of the commands given below.

Command <↑>, <RET> "name": PRG

This command is a very quick and easy way to locate a program on the disk via the directory command '@\$' and then load and run the program with very little further typing. Use this command with the directory on the screen. Cursor up to the program listing and then strike the up arrow key followed by the return key. Without further ado the selected program will load and start running.

Command <Z>, <RET> "name": PRG

Command </>, <RET> "name": PRG

These commands are a very quick and easy way to locate a program on the disk via the directory command '@\$' and then load the program with very little further typing. Use this command with the directory on the screen. Cursor up to the program listing and then strike the percent key followed by the return key. Without further ado the selected program will load at the absolute address specified. Strike the slash key followed by the return key. Without further ado the selected program will load at the normal BASIC program location.

Easy Everyday/DOS-Wedge Commands

<u>Command</u>	<u><↑></u>	<u>name</u>	<u><RET></u>
<u>Command</u>	<u><Z></u>	<u>name</u>	<u><RET></u>
<u>Command</u>	<u></></u>	<u>name</u>	<u><RET></u>

These three commands have been described on the previous page. These commands also work without having the disk directory on the screen.

<u>Command</u>	<u><←></u>	<u>name</u>	<u><RET></u>
----------------	------------------	-------------	--------------------

This command is a minimal keystroke command for saving a program to the disk.

<u>Command</u>	<u><=></u>	<u>name</u>	<u><RET></u>
----------------	------------------	-------------	--------------------

This command is a minimal keystroke command for verifying a program in memory against the program saved as 'name' on the disk.

<u>Command</u>	<u><I></u>	<u><RET></u>
----------------	------------------	--------------------

This command is the easiest way to enter the FLASHMON! machine language monitor. Other entry methods and the FLASHMON! commands are described in the FLASHMON! section of this manual.

<u>Command</u>	<u>@Q</u>	<u><RET></u>
----------------	-----------	--------------------

This command turns off the DOS-Wedge. There are a few programs that require the DOS-Wedge to be turned on before they are loaded and run.

<u>Command</u>	<u>SYS 65526</u>	<u><RET></u>
----------------	------------------	--------------------

This command will turn on the DOS-Wedge after it has been turned off by the above command.

Editing Commands

Command <CTRL><2><RESTORE>

Sets a dark grey background with a light grey border which many color monitor user prefer over the blue.

Command <CTRL><CLR/HOME>

Clears the screen, from the line below the line that cursor is on, to the bottom of the screen. This command replaces the <C><CLR/HOME> in the original FLASH!. In a program the command print chr\$(2) will do the same thing.

Command <CTRL><INST/DEL>

Will delete the rest of the line that the cursor is on. This command replaces the command <C><INST/DEL> in the original FLASH!. In a program the command PRINT CHR\$(11) will do the same thing.

Command POKE 650,0 <RET>

1541 FLASH! adds the auto-repeat command to all the keyboard keys. If for any reason you wish to turn off this feature, type 'poke 650,0' and a 'return'. The all key auto-repeat may be turned on by typing 'poke 650,235' and a 'return'. These commands also have the same effect on the C-64.

Preface

Why NOTEPAD? Have you ever been using your computer and desired to jot something down? Or maybe been in BASIC and desired to print out a small hardcopy note? Or desired to record some information before you started to use your computer? Maybe note down names and locations of programs and files? A quick easy solution to all these situations is available with NOTEPAD.

NOTEPAD gives you a whole screen to write whatever you wish. NOTEPAD does not use any of the normal program memory. For the technically oriented NOTEPAD stores whatever you write, starting at memory address hexadecimal \$bc00. Additional commands allow you to print the NOTEPAD out to any printer connected to the IEEE serial bus.

The NOTEPAD will not work properly if a modem is attached to the user port.

Command <C=><RESTORE>

To go to the NOTEPAD screen simultaneously type 'C=' and 'restore'. This may be done from almost all modes of computer operation. You will be presented with a screen full of miscellaneous characters the first time you enter NOTEPAD. To clear the screen use the normal <SHIFT><CLR/HOME> command.

Command <CLR/HOME>

The first command to initialize the NOTEPAD after entry. To erase the NOTEPAD strike 'shift' and 'clr/home' simultaneously.

NOTEPAD Commands

Command SYS 61662 <RET>

An alternative method of starting the NOTEPAD screen is to type 'sys 61662' followed by a 'return'. The previous command is recommended for the immediate (keyboard) mode of operation. This command is recommended for going to the NOTEPAD from a program.

Command <←> <RET>

Striking the '←' key and a 'return' while in NOTEPAD will cause the NOTEPAD screen to print out on any printer attached to the IEEE serial port of the C-64. If the printer is turned off or attached somewhere else, this command is ignored.

Command SYS 61659 <RET>

Typing, 'sys 61659' and a 'return' will print the NOTEPAD on any printer attached to the C-64 serial IEEE bus. This is an easier command to insert in programs (without the <RET>) than the previous command.

Command <RETURN>

Striking the 'return' key will exit you from NOTEPAD. If you desire to move another line while in NOTEPAD use a shifted 'return' or the cursor keys.

Command <CTRL><RESTORE>

This command will initiate the NMI debugger. For more information on the NMI debugger please see page 18 of this manual or page 24 of the original 1541 FLASH! manual.

Preface

One of the most frustrating features of the Commodore 64 and the C-64, for the serious programmer, is the lack of a built in machine language monitor. No more!! MegaCommand FLASH! adds a machine language monitor to your computer. If you are not familiar with machine language and M.L. monitors, please see your local computer dealer or Skyles Electric Works for some excellent books written about M.L. programming. If you have no interest in M.L. programming do not bother to read this section of the MegaCommand manual. Some of the author's best friends use computers and don't care the least bit about machine language programming.

Command - <|> <RET>

Typing a '|' followed by a 'return' will turn on FLASHMON!. At turn on you will be presented the monitor message:

```
.yr xr ac sr brk+2 s
.00 00 08 30 f768 f7
```

The numbers are the y register, the x register, the accumulator, the status register, the break address plus two and the stack pointer, respectively. The RAM test is not performed upon entering FLASHMON!.

Command SYS 61656 <RET>

Typing 'sys 61656' and a 'return' is an alternate method to enter FLASHMON!.

FLASHMON! Commands

Command <C=><OFF-ON>

The truly hardcore M.L. may go directly to the monitor by holding down the 'C=' key (Commodore key) as you turn on your C-64. The added advantage of this command is that it will circumvent any installed autostart cartridge.

Command <X> <RET>

Example: x <RET>

Typing a 'x' and a 'return' will exit FLASHMON! without affecting the BASIC programs in the computer. This is the recommended method of exiting FLASHMON!, if it was entered from the '!' or 'sys 61656' command. If FLASHMON! was entered by holding down the Commodore (C=) key on turn on of the computer, this command will not exit FLASHMON!. The next command should be used in these situations.

Command <X>, <C> <RET>

Example: xc <RET>

Typing a 'xc' and a 'return' will exit FLASHMON! and reset the Computer. This is the command to use to exit FLASHMON! if it was entered by holding down the <C=> when the power was turned on.

FLASHMON! Commands

Command <M> xxxx yyyy <RET>

Example: m 0800 0900 <RET>

Example: m b000 <RET>

This command will list 8 bytes per line and the poke code interpretation at the right. The listing will be in hexadecimal and will start at hexadecimal address xxxx and continue to hexadecimal address yyyy. The listing can be stopped using the Run/Stop key. If the ending address yyyy is not specified, five lines (40 bytes) will be listed.

Command <:> ssss hh hh <RET>

Example: : 0800 ea 00 ff ad 12 34 b0 60 <RET>

This command allows you to modify any of the hexadecimal code listed by the 'm' command described above. This command will modify code stored in RAM memory, it will not modify code listed in ROM memory.

Command <I> xxxx yyyy <RET>

Example: i 0800 0900 <RET>

Example: i b000 <RET>

This command will list 32 characters per lines of the poke code. The poke codes listed will start at hexadecimal address xxxx and continue to hexadecimal address yyyy. If the ending address yyyy is not specified, 2 lines (64 characters) will be listed.

Command <;> ssss hh hh <RET>

Example: ; 0800 Now is the time for all <RET>

This command allows you to modify any of the poke code listed by the 'i' command described above. This command will modify code stored in RAM memory, it will not modify code listed in ROM memory.

FLASHMON! Commands

Command <G> xxxx <RET>

Example: g 1000 <RET>

This will start executing a code located at hexadecimal address xxxx. Normally a BRK command ends the code.

Command <Shift><G> xxxx <RET>

Example: G 2000 <RET>

This will start executing code located at hexadecimal address xxxx. Additionally the brk+2 address is placed on the stack. This enables the code to end with a RTS command and return to the BASIC interpreter.

Command <T> ssss eeee nnnn <RET>

Example t 2000 25f0 c000 <RET>

This command will transfer (copy) the contents of memory from ssss to eeee to memory starting at new location nnnn. It is possible to copy from ROM memory to RAM memory but not the reverse.

Command <T> ssss eeee-1 ssss+1 <RET>

Example t 2000 25ef 2001 <RET>

This method of using the transfer command gives the function of the fill command. This command will write the contents of ssss into all memory locations from ssss+1 through eeee.

FLASHMON! Commands

Command <S> "DEF" 08 xxxx yyyy+1 <RET>

Example: s "def" 08 8000 9000 <RET>

This command will save the code starting at hexadecimal address xxxx and ending at hexadecimal address yyyy to the disk drive device \$08. The program name assigned will be def.

Command <L> "ABC" <RET>

Example: l "mikroman" <RET>

Example: l "zoom",09 <RET>

This will load a program from the disk drive device hexadecimal 08. The code will load into the memory area that it was saved from. If you wish to load from another disk drive with a device number other than hexadecimal 08 then the command should be; <L> "ABC" zz <RET> where zz is the device number in hexadecimal.

Command <L> "ABC" 08 xxxx <RET>

Example: l "zoom" 08 5000 <RET>

This will load a program from disk drive device hexadecimal 08. The code will be loaded into the memory starting at hexadecimal address xxxx regardless of the memory location that was saved from.

Command <V> "DEF" zz <RET>

Example: v "zoom" 08 <RET>

This command will verify that program DEF has been saved correctly to disk drive device hexadecimal zz. If the device number is not specified it is assumed to \$08.

FLASHMON! Commands

Command <#> ddddd <RET>

Example # 12345 <RET>

This command gives an immediate mode decimal to hexadecimal conversion. The maximum decimal number accepted is 65535.

Command <\$> hhhh <RET>

Example # 3af2 <RET>

This command gives an immediate mode hexadecimal to decimal conversion. The maximum hexadecimal number accepted is ffff.

Command <@> uuu <RET>

This is the general form of the DOS commands described in the 1541 FLASH! manual. FLASHMON! supports all of these commands. For more information on these commands please see pages 5 through 8 of this manual and pages 9 through 14 of the 1541 FLASH! Manual. If FLASHMON! is entered by holding down the <C> key on power up, the DOS commands will not work.

Command <>> uuu <RET>

This is the alternative form of the DOS/Wedge command discussed above. It is generally not recommended because it requires a simultaneous two key strike.

Command <SHIFT><G> fOdb <RET>

Example G fOdb <RET>

This command will print the screen to any printer attached to the IEEE serial port of the C-64. If the printer is turned off or attached somewhere else, this command is ignored.

FLASHMON! Commands

Command <C=><RESTORE>

To go to the NOTEPAD screen type;
<C=><RESTORE>. This may be done from almost all modes of computer operation. For more information see pages 10 and 11 of this manual.

Command <CTRL><RESTORE>

This command will initiate the NMI debugger. For more information on the NMI debugger please see below or page 24 of the original 1541 FLASH! manual.

NMI Debugger

Wonder where your program hung up? Here is a means of finding out. Hold down 'CTRL' and hit 'restore'. The Y,X,A and Status registers, PCL/PCH and the stack pointer-6 will be printed on the screen in that order.

01 02 03 22 31 ea f0

In the above example the program was interrupted at \$ea31 with the Y register containing \$01, X \$02 and the accumulator \$03. The SR contained \$22. The stack pointer was at \$f6 (\$f0 + \$06)

FLASHMON! Commands

General Notes

FLASHMON! allows commas, spaces, or dashes, for separators. For example; <S> "ABC",zz,xxxx-yyyy <RET> works as well as the command given on page 14.

Memory Usage:

Loc	Usage	Loc	Usage
\$9b	scratch	\$0200	filename strt addr.
\$9c	scratch	\$02a7	y reg. save
\$b0	scratch	\$02a8	x reg. save
\$b1	scratch	\$02a9	accumulator save
		\$02aa	status reg. save
		\$02ab	stack pointer save
		\$02ac	input vector

FLASHMON! saves the above named registers upon turn on. FLASHMON! restores the registers when a <G> or <Shift><G> command.

All input is vectored to a routine at \$02ac. If you wanted to look under the kernel or i/o you could change this routine.

```
sei          ;How it is now
lda ($b0),y
rts
```

```
sei          ;Routine to look under
ROM's
ldx 1
lda #$34
sta 1
lda ($b0),y
stx 1
rts
```

```
: 02ac 78 a6 01 a9 34 85 01 b1
: 02bc b0 86 01 60 00 00 00
```

Miscellaneous Notes

The default device number for a LOAD is 8. The default device number for a OPEN is 8 with a secondary of 15.

Because the NOTEPAD operates on the NMI, you could even use it while a basic program is running.

From FLASHMON! you can load a sequential file into memory with
1 "name,s,r" 08 0400.

Good luck using the tape...you'll need it! ALL of the removable tape routines have been removed. You may still switch back to the old slow C-64 kernal for tape operations.

Good Luck, 'Happy Hacking'

Bryce Nesbitt

Enjoy

Bob Skyles

SKYLES ELECTRIC WORKS

**1541 FLASH!
WARRANTY CARD**

COMMODORE 64tm SERIAL NO. _____

COMPANY NAME _____

NAME _____

ADDRESS _____

CITY/STATE/ZIP _____

COUNTRY _____

SIGNATURE _____

DATE _____

PRINT NAME _____

Name

Address

City

State

Zip

BUSINESS REPLY MAIL

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POSTAGE WILL BE PAID BY:

SKYLES ELECTRIC WORKS

231E South Whisman Road
Mountain View, CA 94041

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

The following is a list of the names of the persons who have been associated with the project since its inception in 1945. The names are listed in alphabetical order.

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