HP 41CL

Quick Reference Guide

CONVENTIONS

- ALPHA entries are framed by quotes. ALPHA YFNS ALPHA is depicted as "YFNS".
- Execution of functions is depicted without quotes of XEQ. XEQ "PLUG1L" becomes PLUG1L.

REFERENCES

Monte Dalrymple: [1]
- 41CL BETA TEST STATUS
- WORKING WITH FLASH
- 41CL MANUAL YFNS C

Angel Martin[2]
- CURRENT STATUS OF CLUTILS

Etienne Victoria
- Suggestions and email collections; specifically the CLONIX XROM to CL section.

Geoff Quickfall[3]
- QUICK REFERENCE GUIDE TO THE HP41CL
- HP41CL QRG (this guide)

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[1] http://www.systemyde.com/hp41/index.html
[2]

http://www.wiki4hp.com/doku.php?id=41cl:replacement_cpu_board:cl_rom_and_routines

[3] Contact geoffqf@telus.net for a copy

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RAM AND FLASH RAM

There are locations of USER RAM and FLASH RAM which are accessed by routines listed here.   For example, you may use one of the 4K User ROM Images. Therefore, they should not be used for other purposes.

A table has been included for your convenience, with a list of memory locations that are used by the routines in CLUTIL_G and routines in this QRG.

Also, as you define your CL the list could be added to. Blank entries are left for your convenience:

	PRGRM	FLASH	RAM
1	*CLUTIL_G*	*XXXC OD8*	*-*
2	*YFNS*	*-*	*80C*
3			
4			
5			
6			
7			
8			
9			
10			
11			

-807-RAM can be used for testing prior to copy to FLASH.

CALCULATOR TO FLASH

```
1.        LBL "YWALL"
2.        TURBO50
3.        "062>80C"
4.        YMCPY
5.        "80C-RAM"
6.        PLUG1L
7.        "0C9000"
8.        YFERASE
9.        "800>0C9
10.       YFWR
11.       "804>0CF"
12.       YFWR
13.       "YFNS"
14.       PLUGIL
15.       END
```

-Lines 11 and 12 need not be keyed if MMU
state is not required for backup.
-To copy another 'calculator state' to
FLASH, select a free FLASH USER
address. Substitute 0C9 and 0CF with the
new USER FLASH address. Once
completed note the address in table on page
5.

```
        Ex.  Line  9 "800>0D1"
             Line 11 "804>0D7"
```

FLASH TO CALCULATOR

```
1.          MMUCLR
2.          "YFNS"
3.          PLUG1L
4.          MMUEN
5.          TURBO50
6.          "0C9>800"
7.          YMCPY
8.          "0CF>804"
9.          YMCPY
```

NOTES:

-Manual key inputs required to copy the FLASH resident copy of the Calculator back to the Calculator. A routine will not work unless it resides in RAM or Physical module.

-These are compatible with CLUTILS_G "YWALL function.

-Lines 8 to 9 are not required for the calculator to operate.

-Insert your desired FLASH address (see previous page) at line 6 and 8.

CLUTIL_G and YFNZ / YFNS

YFNZ XROM ID# is 15.
YFNS XROM ID# is 31.
CLUTIL_G uses XROM ID# 15.

YFNZ is used at the 'initial software configuration' [4]

YFNZ cannot be patched as it resides in protected FLASH RAM.

If a patch is required, then YFNS is used and the 'initial software configuration' steps become:

1.	MMUCLR
2.	"YFNS"
3.	PLUG1L
4.	MMUEN

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[4] " 41CL MANUAL YFNS C"

Since the calculator is now using YFNS; CLUTIL_G will not be able to access it due to the ID # 31. Thus a patch to YFNS is required to change the ID # 31 to ID # 15.[5]

This change is only required if you want to use CLUTIL_G and the patched versions YFNS.

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[5] "Quick Reference guide to the 41CL"

CLONIX XROM TO CL[6]

The following steps may be used to copy an XROM to the HP41CL.

- Copy XROM image to CLONIX using a page that the CL does not map to.
- Find an empty USER RAM location
- Copy CLONIX to USER RAM.
- PLUG XROM into free PORT.

```
Ex   RAM 807 is free
     PORT3U is free

1.   CLUTIL_G TO CLONIX:

        a. PAGE F000
        b. BANK 1
        c. XROM CLUTIL_G
```

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[6] "Quick Reference guide to the 41CL"

2. CLONIX TO HP 41CL

  a. "F-0>807"
  b. YMCPY

3. TURN OFF HP 41CL

4. REMOVE CLONIX

5. TURN ON HP 41CL

  a. "807-RAM"
  b. PLUG3U

PLUG UNPLUG .... U-PG

Prompts for:
- F .... FUN
- W .... WORK
- U .... UPLUG ALL

```
1.    LBL "U-PG"
2.    SF 01
3.    XEQ 62
4.    "F W U"
5.    AVIEW
6.    GETKEY
7.    GTO IND X
8.    LBL 13
9.    "TREK"
10.   PLUG1U
11.   "FUNS"
12.   PLUG2
13.   "GAME"
14.   PLUG3
15.   GTO 10
16.   LBL 63
```

```
17.   "AOSX"
18.   PLUG1U
19.   "PPCM"
20.   PLUG2
21.   "EXTI"
22.   PLUG3L
23.   "807-RAM"
24.   PLUG3U
25.   GTO 10
26.   LBL 61
27.   UPLUG1U
28.   UPLUG2
29.   UPLUG3
30.   UPLUG4
31.   FS?C 01
32.   RTN
33.   LBL 10
34.   DONE
35.   AVIEW
36.   END
```

- Uses GETKEY to access subroutine.
- Rename keys to suit your needs.
- Insert desired XROMS.
- Line 23 shows how RAM can be used to 'house' an XROM image. In this case CLUTIL_G is in RAM prior to me moving it to XXXA in FLASH ram.
- In the above routine, selecting W (work) will load the following XROMS:
    - "AOSX"
    - "PPCM"
    - "EXTI"
    - "807-RAM" (current version of CLUTIL_G)

SET GMT............................... SGMT

When the calculator suffers a
MEMORY LOSS or power interrupt,
the TIME MODULE will reset. This
routine resets the clock to GMT.

```
1.    LBL SGMT
2.    "DATE?"
3.    PROMPT
4.    SETDATE
5.    "TIME?"
6.    PROMPT
7.    SETIME
8.    "+-GMT?"
9.    PROMPT
10.   CHS
11.   T+X
12.   CLOCK
13.   END
```

HP 41CL SAMPLE ROUTINE

Using the above routines to bootstrap calculator after MEMORY LOSS situation.

The U-PG and SGMT routines can be appended to the "Flash to Calculator" steps to bring the calculator back to its original state:

Example:

```
1.      MMUCLR
2.      "YFNS"
3.      PLUG1L
4.      MMUEN
5.      TURBO50
6.      "0C9>800
7.      YMCPY
8.      "0CF>804"
9.      YMCPY
10.     XEQ "U-PG
11.     XEQ "SGMT"
```

HP 41CL
FUNCTIONS

```
1.    MMUCLR
2.    MMUDIS
3.    MMUEN
4.    MMU?
5.    TURBOX
6.    TURBO2
7.    TURBO5
8.    TURBO10
9.    TURBO20
10.   TURBO50
11.   TURBO?
12.   YPOKE
13.   YPEEK
14.   YMCLR
15.   YMCPY
16.   YBPNT
17.   YBPNT?
18.   YBUILD
19.   PLUG1
20.   PLUG1L
21.   PLUG1U
22.   PLUG2
23.   PLUG2L
24.   PLUG2U
25.   PLUG3
```

```
26.  PLUG3L
27.  PLUG3U
28.  PLUG4
29.  PLUG4L
30.  PLUG4U
31.  UPLUG1
32.  UPLUG1L
33.  UPLUG1U
34.  UPLUG2
35.  UPLUG2L
36.  UPLUG2U
37.  UPLUG3
38.  UPLUG3L
39.  UPLUG3U
40.  UPLUG4
41.  UPLUG4L
42.  UPLUG4U
43.  YFERASE
44.  YFWR
45.  BAUD96
46.  BAUD48
47.  BAUD24
48.  BAUD12
49.  SERINI
50.  YGETLB
51.  YGETUB
52.  YPUTLB
```

```
53.  YPUTUB
54.  YEXP
55.  YIMP
56.  YSEC
57.  PLUGP
58.  UPLUGP
59.  PLUGH
60.  UPLUGH
```

CLUTILS_1H FUNCTIONS

#	Function	Description
1	-CLUTLS 1H	Module Header
2	?MMU	MMU Status Yes/No
3	ΣCLF _	Global Launcher
4	BAUD _	Baud functions launcher
5	CLLIB _	CL ID Library
6	MMU _	MMU functions launcher
7	MMUCAT	MMU Catalog
8	PLG#4 _	Page#4 Plug
9	PLUG _	PLUG functions launcher
10	PLUG?	Page Location MMU
11	ROMLIB	ROM Library
12	UPG#4	Clears MMU entry for page #4
13	TURBO _	TURBO functions launcher
14	UPLUG _	UPLUG functions Launcher
15	Y1SEC	One-second delay
16	YBSP	ALPHA back Space
17	YCL>	Clears string from ">"
18	YCL-	Clears string from hyphen
19	YFNZ?	Page location of YNFS
20	YINPT _	Y Input
21	YRALL	Y-Read-ALL
22	YSWAP>	swaps both sides of ">"
23	YSWAP-	swaps both sides of hyphen
24	YWALL	Y-Write-ALL
25	-SYS/EXT	Section Header
26	ADRID	Address ID
27	BFCAT	Buffer Catalog
28	BLCAT	Block Catalog
29	CDE	Code
30	DCD	Decode
31	DTOA	Display to ALPHA
32	DTST	Display Test
33	HEPCL	HEPAX FileSys Init - CL
34	HEPINI	HEPAX FileSys Init - ML2k
35	SECURE	enable password lock
36	UNLOCK	disable password lock
37	XPASS	change password

#	Function	Inputs
1	-CLUTLS 1H	n/a
2	?MMU	none
3	ΣCLF _	Prompts "B:M:P:T:U"
4	BAUD _	Prompts "1:2:4:9"
5	CLLIB _	Prompts "A-Z"
6	MMU _	Prompts "C:D:E:?"
7	MMUCAT	none
8	PLG#4 _	Prompts "F:L:S"
9	PLUG _	Prompts for location
10	PLUG?	Prompts for page
11	ROMLIB	Displays all ROMs
12	UPG#4	none
13	TURBO _	Prompts "X:2:5:1:0:,:?"
14	UPLUG _	Prompts for location
15	Y1SEC	none
16	YBSP	string in ALPHA
17	YCL>	string in ALPHA
18	YCL-	string in ALPHA
19	YFNZ?	none
20	YINPT _	none
21	YRALL	none
22	YSWAP>	string in ALPHA
23	YSWAP-	string in ALPHA
24	YWALL	none
25	-SYS/EXT	n/a
26	ADRID	Address in Alpha
27	BFCAT	none
28	BLCAT	none
29	CDE	HexCode in ALPHA
30	DCD	NNN in X
31	DTOA	Display contents
32	DTST	none
33	HEPCL	none
34	HEPINI	# pages in X, first page in Y
35	SECURE	none
36	UNLOCK	asks for password
37	XPASS	asks old/new passwords

#	Function	Output
1	-CLUTLS 1H	n/a
2	?MMU	YES/NO, skip if false
3	ΣCLF _	Launches selected Launcher
4	BAUD _	Launches selected function
5	CLLIB _	Starts listing at selected letter
6	MMU _	Launches selected function
7	MMUCAT	Sequential list of MMU Entries
8	PLG#4 _	Selected ROM plugged
9	PLUG _	ROM with ID in ALPHA is plugged
10	PLUG?	content of MMU entry for page
11	ROMLIB	Sequential list of ROM ID's
12	UPG#4	MMU entry cleared
13	TURBO _	Launches selected function
14	UPLUG _	Location is removed from MMU
15	Y1SEC	1-sec delay
16	YBSP	Deletes rightmost character
17	YCL>	Clears from ">" char to the right
18	YCL-	Clears from "-" char to the right
19	YFNZ?	Location in MMU
20	YINPT _	HEX entry plus control chrs
21	YRALL	Reads Calculator/MMU from Flash
22	YSWAP>	Alpha swapped around ">"
23	YSWAP-	Alpha swapped around "-"
24	YWALL	Writes Calculator/MMU to Flash
25	-SYS/EXT	n/a
26	ADRID	ROM ID in Alpha
27	BFCAT	Shows present buffers
28	BLCAT	Lists block contents
29	CDE	NNN in X
30	DCD	HexCode in Alpha
31	DTOA	Text in Alpha
32	DTST	Shows display all lit up
33	HEPCL	Configures HEPAX on CL
34	HEPINI	Iinitializes HEPAX File System
35	SECURE	Sets SECURE mode ON
36	UNLOCK	Sets Secure mode OFF
37	XPASS	Password is changed

#	Function	Comments
1	-CLUTLS 1H	*n/a*
2	?MMU	Places 1/0 in X
3	ΣCLF _	BA to cancel out
4	BAUD _	BA to cancel out
5	CLLIB _	valid chrs: R/S, SST, SHIFT, ENTER^, BA
6	MMU _	BA to cancel out
7	MMUCAT	valid chrs: R/S, SST, SHIFT, ENTER^, BA
8	PLG#4 _	"OK" in Alpha. *Take-over ROMS!*
9	PLUG _	BA to cancel out
10	PLUG?	Alpha is changed
11	ROMLIB	like CLLIB, starts with "A". Programmable
12	UPG#4	Alters ALPHA
13	TURBO _	BA to cancel out
14	UPLUG _	Valid chrs: 1-4, L, U, BA
15	Y1SEC	shuold not depend on Turbo speed
16	YBSP	Stack is not changed
17	YCL>	Nothing if ">" is not present
18	YCL-	Nothing if "-" is not present
19	YFNZ?	Does stack lift.
20	YINPT _	use "M" for "RAM", "K" for "16K"
21	YRALL	OK / OKALL in ALPHA
22	YSWAP>	Nothing if ">" is not present
23	YSWAP-	Nothing if "-" is not present
24	YWALL	"OK" / "OKALL" in ALPHA
25	-SYS/EXT	*n/a*
26	ADRID	Address as returned by YPOKE
27	BFCAT	Has control characters
28	BLCAT	Paused while key is pressed
29	CDE	A classic used in subroutines
30	DCD	A classic used in subroutines
31	DTOA	Elusive to use - fun to see.
32	DTST	To amaze your friends
33	HEPCL	RAM in Pages C-F, ROM in pg. B
34	HEPINI	Use anytime required.
35	SECURE	Password asked upon startup
36	UNLOCK	Calculator is switched off
37	XPASS	Security mode not changed