EECE416 :Microcomputer Fundamentals and Design

source: www.mwftr.com

Easy68K

– Editor, Assembler, and Simulator

TUTORIAL

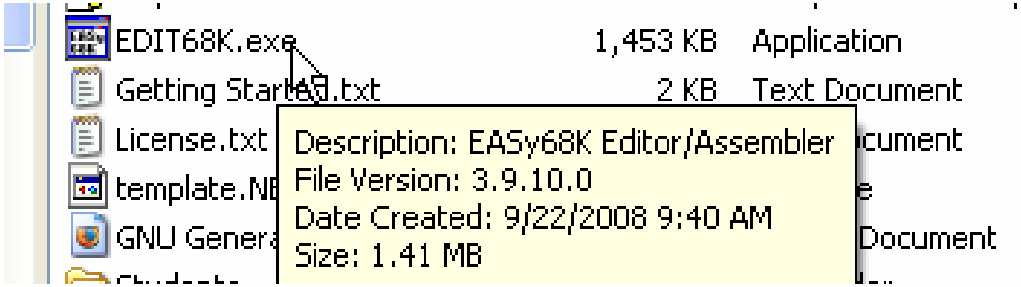
Charles Kim

Easy68K and Download

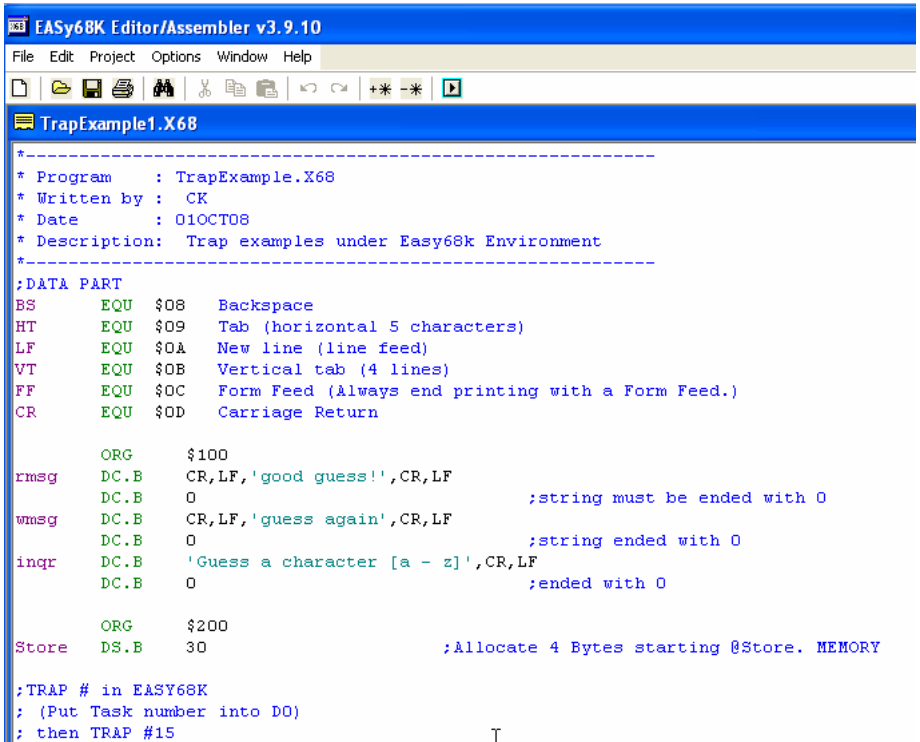
Download and Install this!

EDIT68K

- EDIT68K.EXE
  - For Coding and Assembling

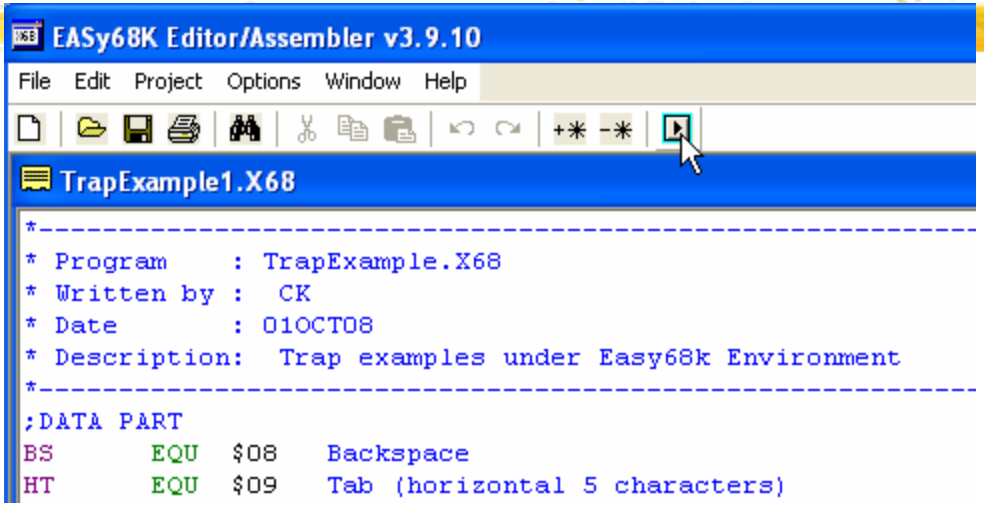


- Coding
- Save

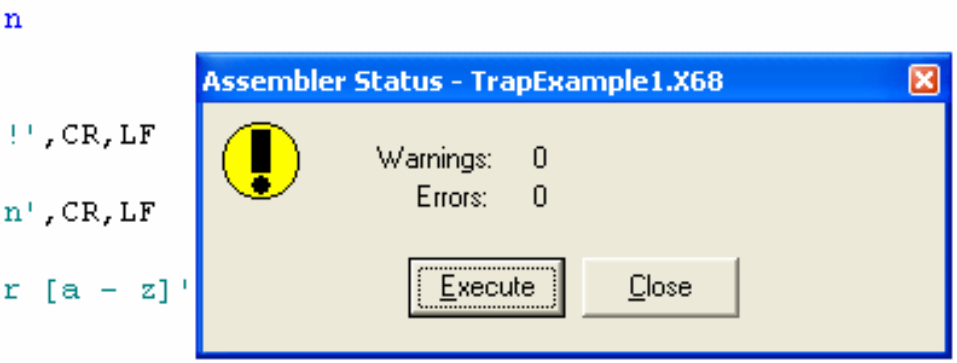


Assembling

- Click the “Assemble Source Code” button OR F9 Key

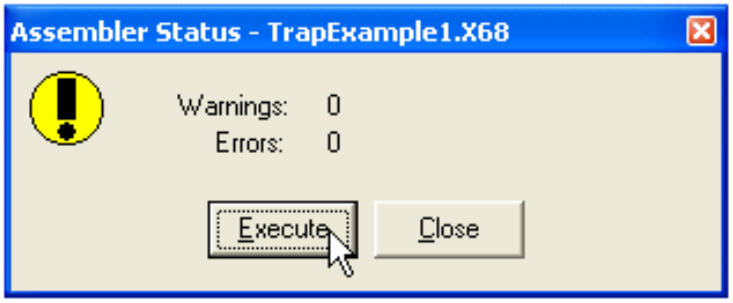


- When there is no Error, the following window pops up.

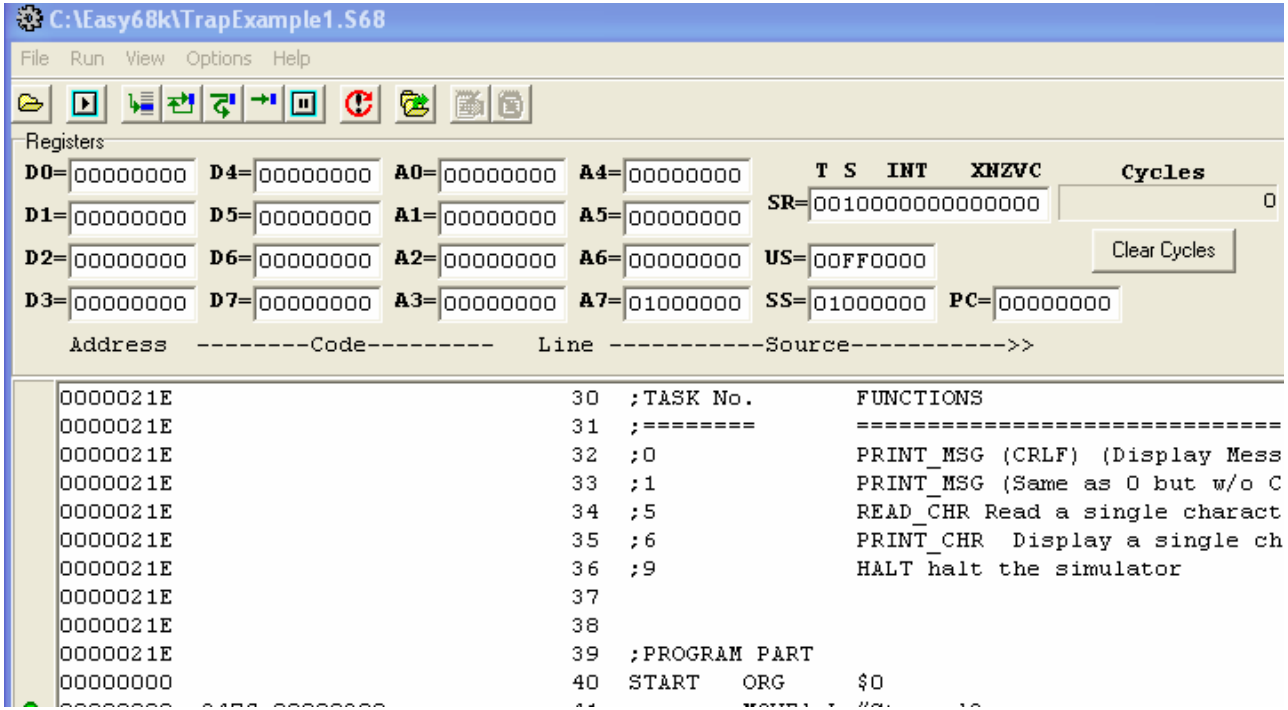


Simulation

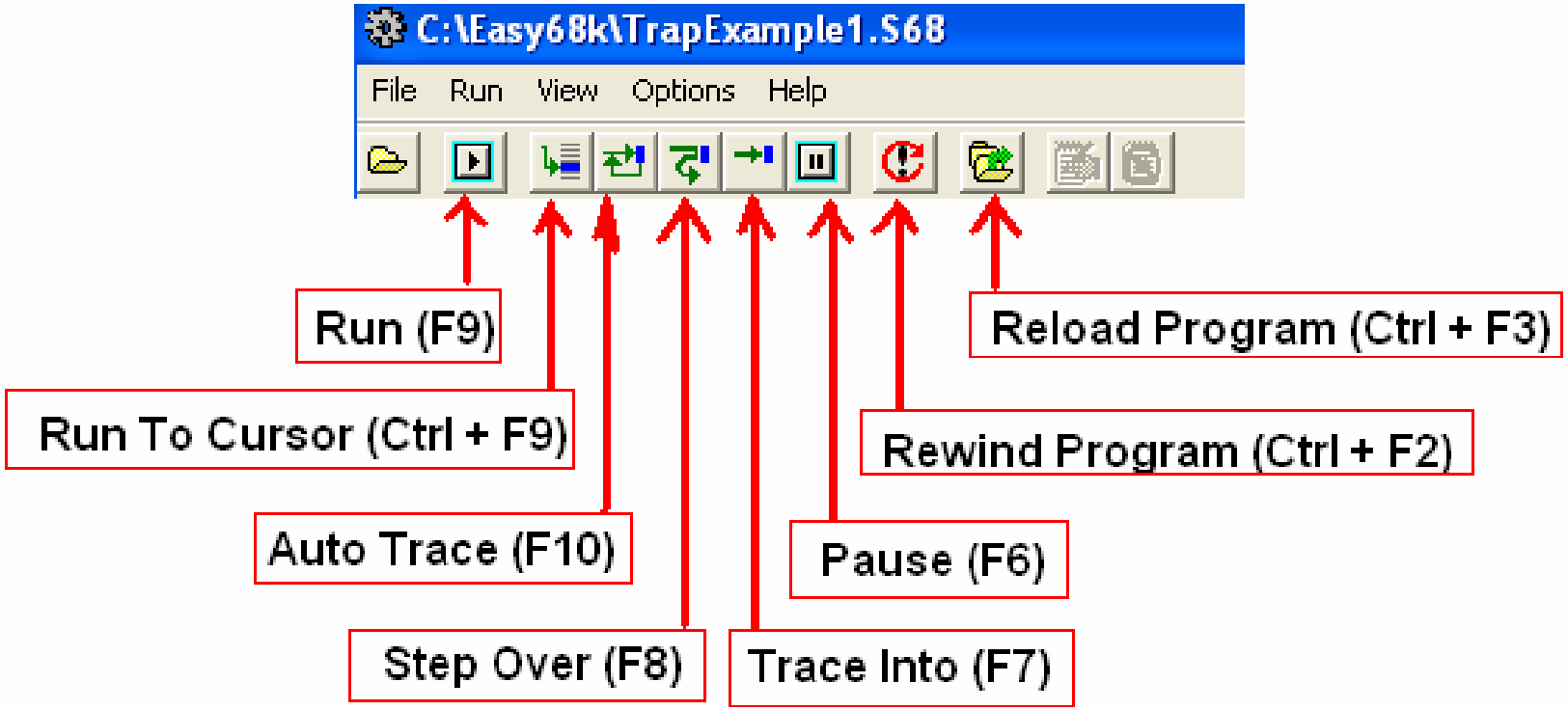
- Click, “Execute” button.



- Initial Simulation Screen
-

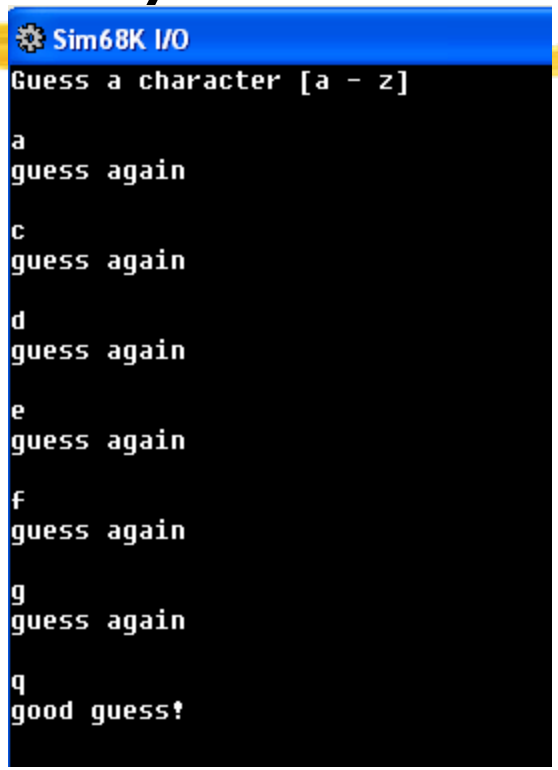


Simulation Buttons

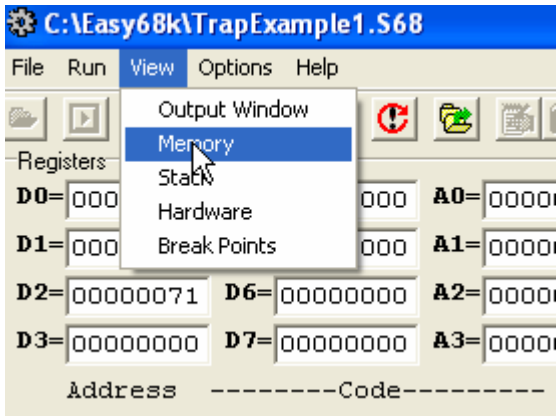


Memory View

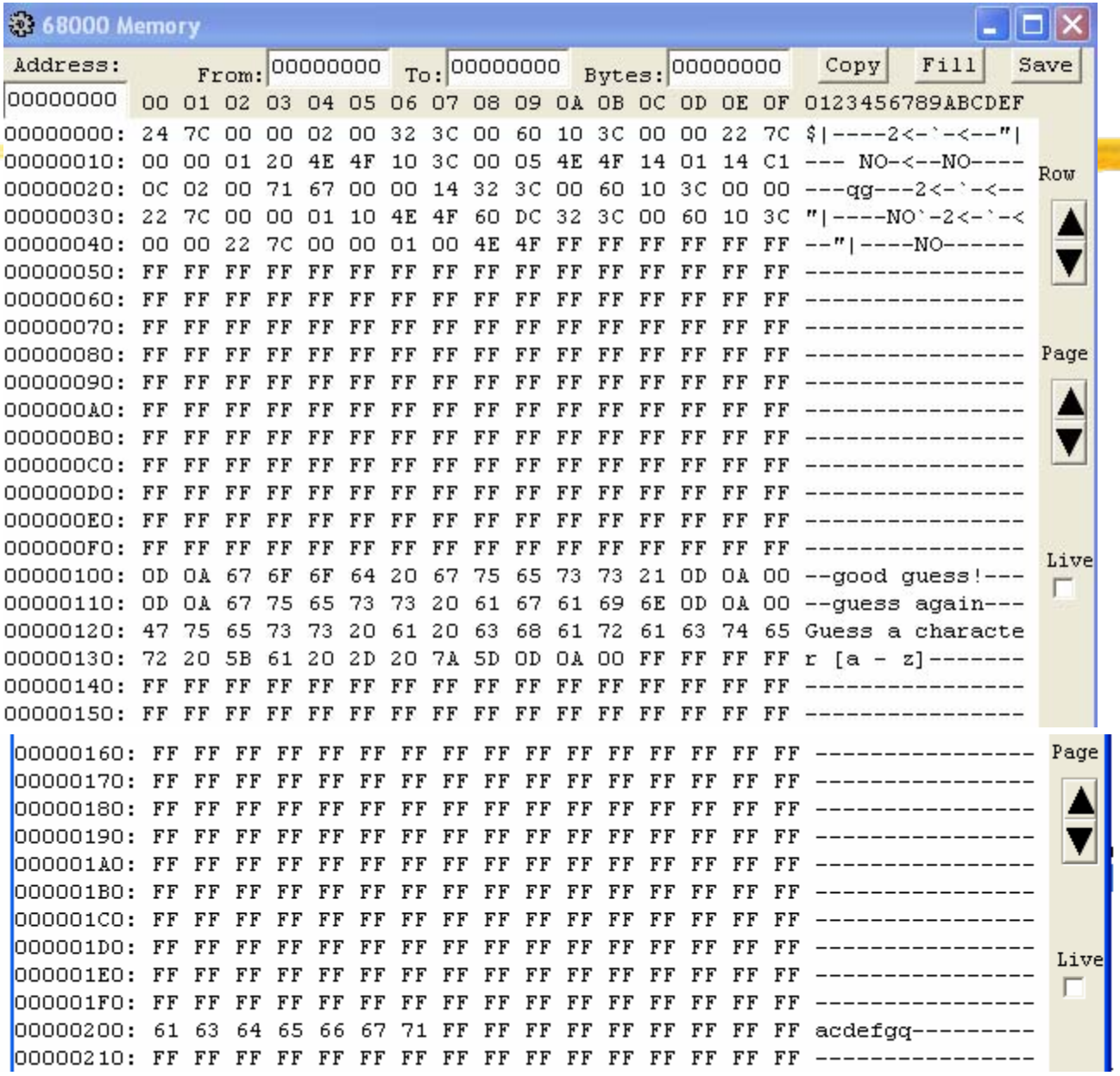
- **After Auto Trace or Run (with Cmd screen)**



- **Click “View” and Select “Memory”**



Memory View


68000 Memory
Address:
From: 00000000
To: 00000000
Bytes: 00000000
Copy
Fill
Save
00000000 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F 0123456789ABCDEF
00000000: 24 7C 00 00 02 00 32 3C 00 60 10 3C 00 00 22 7C $|----2<-`-<--"|
00000010: 00 00 01 20 4E 4F 10 3C 00 05 4E 4F 14 01 14 C1 --- NO-<--NO----
00000020: 0C 02 00 71 67 00 00 14 32 3C 00 60 10 3C 00 00 ---qg---2<-`-<--
00000030: 22 7C 00 00 01 10 4E 4F 60 DC 32 3C 00 60 10 3C "|----NO`-2<-`-<
00000040: 00 00 22 7C 00 00 01 00 4E 4F FF FF FF FF FF FF --"|----NO------
00000050: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00000060: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00000070: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00000080: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00000090: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
000000A0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
000000B0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
000000C0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
000000D0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
000000E0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
000000F0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00000100: 0D 0A 67 6F 6F 64 20 67 75 65 73 73 21 0D 0A 00 --good guess!---
00000110: 0D 0A 67 75 65 73 73 20 61 67 61 69 6E 0D 0A 00 --guess again---
00000120: 47 75 65 73 73 20 61 20 63 68 61 72 61 63 74 65 Guess a characte
00000130: 72 20 5B 61 20 2D 20 7A 5D 0D 0A 00 FF FF FF FF r [a - z]-------
00000140: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00000150: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
Row
Page
Live
00000160: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00000170: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00000180: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00000190: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
000001A0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
000001B0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
000001C0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
000001D0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
000001E0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
000001F0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
00000200: 61 63 64 65 66 67 71 FF FF FF FF FF FF FF FF FF acdefgq---------
00000210: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF ----------------
Page
Live

TRAPs in EASY68K

- TRAP
  - Interruption of Execution
  - Respond Programmer's Task Command
- Number of Tasks in Easy68K
  - 22 Tasks
  - Examples
    - Read Message (from Keyboard)
    - Print Message (to Computer Monitor)
    - Read a Character
    - Print a Character
    - Read a Number
    - Print a Number
    - Etc
- **Traditional TRAP tasks**
  - **Print Message (to Computer Monitor) of address at A1**
    - **--- Task # 0 (with CR.LF)**
    - **--- Task #1 (without CR.LF)**
  - **Read a Character and store it at D1.B --- Task #5**
  - **Print a Character stored at D1.B --- Task #6**
  - **Key Echo On on or off --- Task #12 (OFF– D1.B==0, ON --- D1.B== Non zero)**
- How is a TRAP called/executed?
  - Put task number to A1 or D0
  - Put address into A1 (for "print message" case)
  - Then "Trap #15" instruction line

```
MOVE.B   #5,D0          Read a single character
TRAP     #15            Store into D1
```

```
MOVE.B   #0,D0
MOVEA.L  #rmsg, A1
TRAP     #15
```

2 or 3 steps for TRAP

- Step 1 (for only *Read /Print Message* case)
  - Put the length of the message in number of characters into D1 register
- Step 2
  - Put the task number to D0 Registers
    - Task Numbers
      - 0 ---- Print Message (which is stored at the memory whose starting address is stored in A1 register) ended with LF and CR
      - 1 ---- Print Message ended without LF/CR
      - 5 ---- Read a single character from Keyboard (the read character is stored to D1 register)
      - 6 ---- Print a single character (stored in D1 register) into the computer screen
- Step 3
  - Execute the Trap by the instruction of “Trap #15”

Illustration-1

Print a message of 8 characters stored from the memory address of $200. * Task # is 1

1. Put addr $200 into A1. | 200 | A1
2. Put the length to D1 register. | 8 | D1
3. Put the task # to D0 | 1 | D0
4. 'Trap #15'

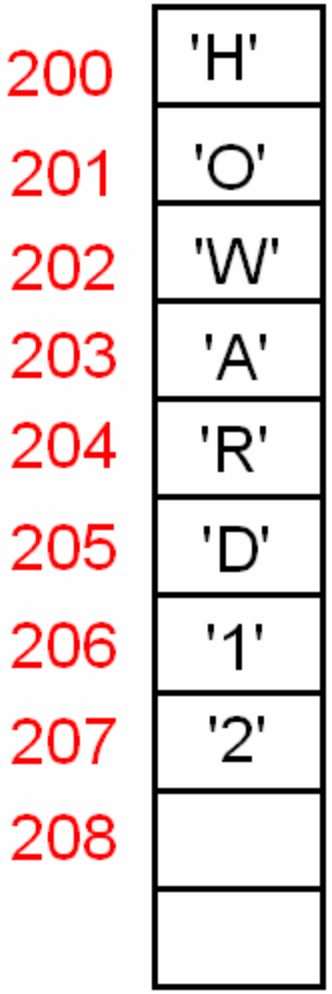
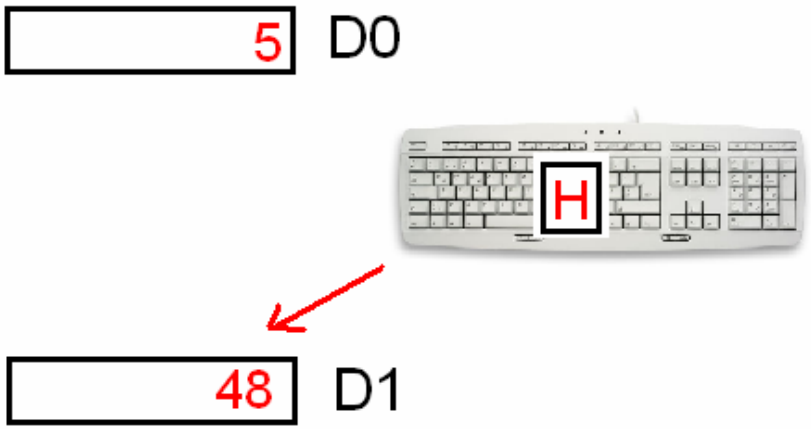


Illustration - 2

Read a character typed in from a keyboard.
(Task # = 5)

1. Put the task # to D0 register
2. Waits for a key (Program does it automatically. Only when key is entered then the next line of code executes.)
3. When a key is entered, its ASCII value is stored in D1 register.



Trap Example Code

EASy68K Editor/Assembler v4.7.3 - [TrapEx.X68]

File Edit Project Options Window Help

```
*-----------------------------------------------------------
* Program    : TrapEx.X68
* Written by :  CK
* Description:  Trap examples under Easy68k Environment
*-----------------------------------------------------------
;DATA PART

LF      EQU  $0A   New line (line feed)
CR      EQU  $0D   Carriage Return

        ORG     $100
rmsg    DC.B    CR,LF,'good guess!',CR,LF
        DC.B    0                                   ;string must be ended with 0
wmsg    DC.B    CR,LF,'guess again',CR,LF
        DC.B    0                                   ;string ended with 0
inqr    DC.B    'Guess a character [a - z]',CR,LF
        DC.B    0                                   ;ended with 0


;TRAP # in EASY68K
; (Put Task number into D0)
; then TRAP #15
```

- Type the first code
- Assemble it
- Simulation with Step Over (F8) and Trace the D0, D1, and A1 registers