TOPPERS

Introductory implementation seminar

Tools application notes

TOPPERS Project

Educational Working Group

How to use tools

Building and executing using GNU development tool

1. Set board to write mode and write simple monitor onto board (first time only)
2. Turn board power off, switch to run mode and turn power on to start simple monitor
3. Build program through “make” command
4. Start terminal software and download program to RAM using “ld” (load) command
5. Execute program using “go” command

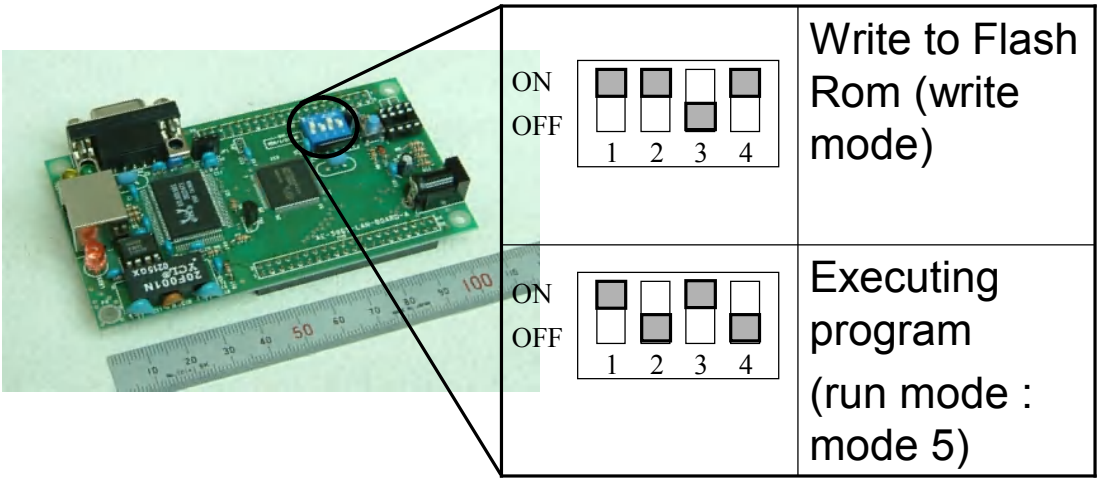
Confirm the AKI-H8/3069F board. Connect the board D-SUB9 pin connector and the computer D-SUB9 pin connector using the RS232C cable. Connect the power cable as well.

Terminal settings are as follows:

- Baud rate : 38400(bps)
- Data string length : 8 bits
- Stop bit : 1 bit
- Parity : none

Action 1

Relation between dip switch position and modes



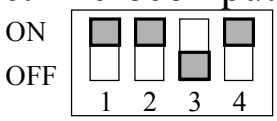
The board mode setting differs when writing in the simple monitor to flash ROM and executing the user program.

Turn the power off when switching modes.

Action 2

Write simple monitor to Flash ROM

1. Connect PC and microcomputer board using RS-232C cable
2. Set microcomputer board to write mode



3. Turn microcomputer board power on
4. Start up Cygwin on PC and move to directory where the simple monitor exists
   （$ cd toppers-beginner-h8/monitor/）
   ※ by pressing the TAB key, the directory name will appear in full
5. Write simple monitor to board ROM
   （$ h8write -3069 –f20 mon3069.mot）

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If the simple monitor is not written to the flash ROM, switch the board to flash ROM write mode and write in the simple monitor to flash ROM.

The simple monitor is located in the following folder

directory: toppers-beginner-h8/monitor

file name: mon3069.mot

Execute the following commands at the Cygwin command prompt:

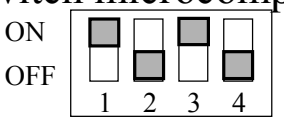
```
cd toppers-beginner-h8/monitor/

h8write -3069 –f20 mon3069.mot
```

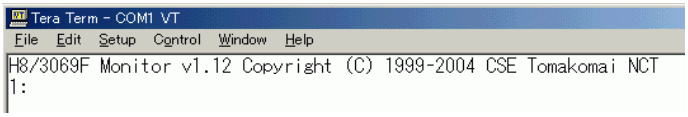
Action 3

Startup monitor on the microcomputer board

1. Turn off power of the microcomputer board
2. Switch microcomputer board to run mode (mode5)



3. Startup terminal software on PC
4. Turn on power of the microcomputer board



※ monitor will startup and the above screen will appear
※ press the board reset switch for restarting the monitor after initial startup

Action 4

Create user program using the make command

1. On Cygwin, move to the directory where the user program exists
   （$ cd ../application/non_os）
2. On Cygwin, execute “make” command
   （$ make）
   ※S-record type file (non_os.srec) will be created in current directory

```
$ make
h8300-hms-gcc -c  -mh -mint32 -mrelax -g -O2 -DLABEL_ASM -Wno-main  -DCPU_CLOCK=
20000000 -DAKI_MONITOR -I. -Iconfig  -I../../device config/cpu_config.c
```

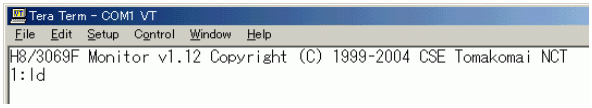
(skip)

```
h8300-hms-gcc  -mh -mint32 -mrelax -g -O2 -DLABEL_ASM -Wno-main  -DCPU_CLOCK=200
00000 -DAKI_MONITOR -I. -Iconfig  -I../../device -nostdlib  -T config/debug.ld -
o non_os.exe ¥
                start.o  cpu_config.o startup.o sys_config.o timer0.o hw_timer.o
 device.o sil_akih8_3069f.o  cpu_support.o sys_support.o   -lgcc
h8300-hms-nm non_os.exe > non_os.syms
h8300-hms-objcopy -O srec -S non_os.exe non_os.srec
```

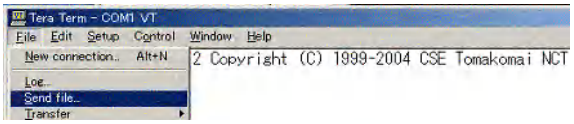

Action 5

Transfer program to RAM and execute

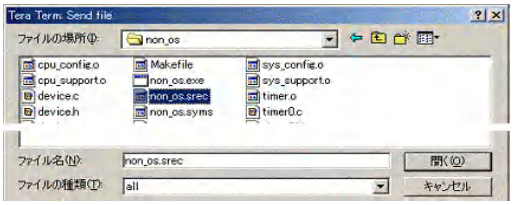
1. Type in “ld” using the terminal software



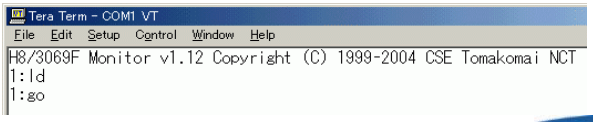
2. Select “File – Sendfile”



3. Select S-record format file of the program that you wish to execute and click OPEN (transfer program)



4. After transfer is completed, type in “go” (program execution)



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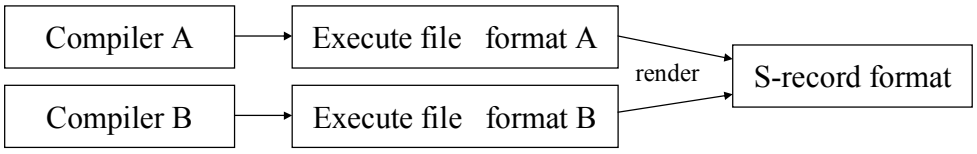
Action – note 1
Operation mode

Mode 1 Mode 2	Built-in ROM invalid extension 1M byte mode
Mode 3 Mode 4	Built-in ROM invalid extension 16M byte mode
Mode 5	Built-in ROM valid extension 16M byte mode
Mode 7	Single chip advanced mode

Action – note 2

S-record format files

Execute files differ depending on the compiler that is used. S-record format is one standard format used when ROMifying

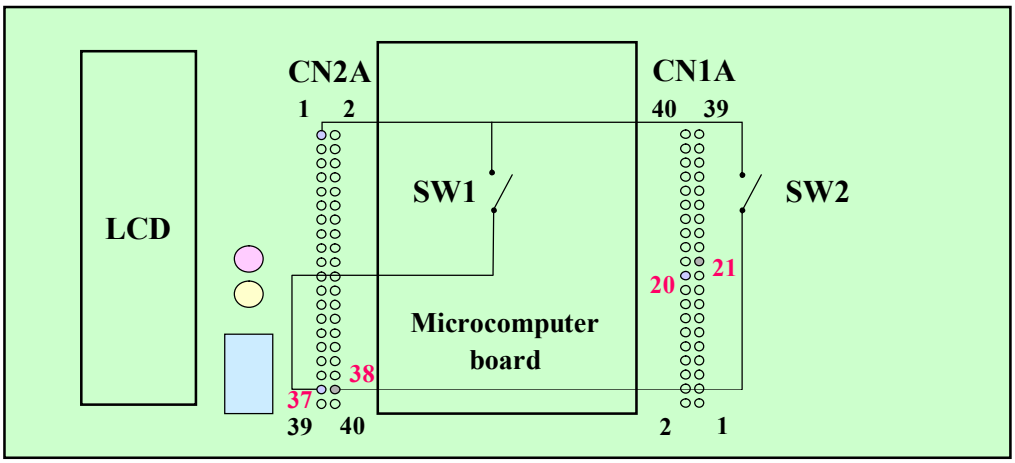


※ in this seminar, the extension of the S-record format file is .srec

Format of execute file formats differ with every compiler. It is difficult for the ROM writer and other tools to deal with all formats. Therefore, standard formats are available so that tools can correspond in later processes such as the S-record format.

Test environment 1

Wiring for polling



※DIP SW1-1,1-2 are OFF

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In this session, the dip switch available on the board is used. Preparing an external switch like in the diagram to prevent chattering from the dip switch is an effective method.