

EZT. Design with STM32-comStick from HITECH

STM32-comStick



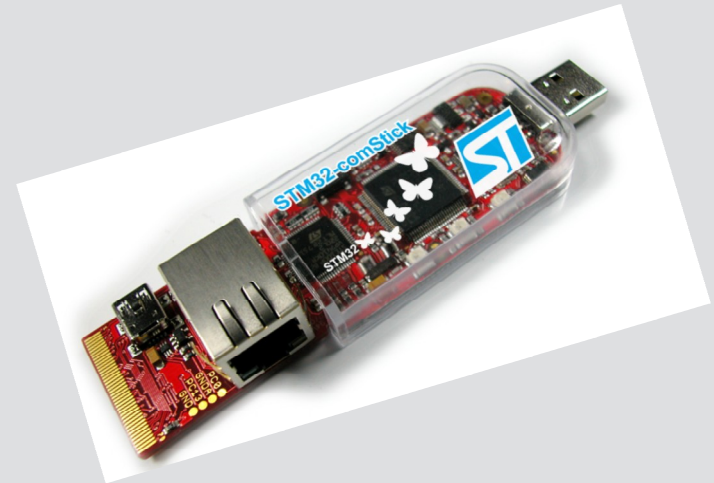
Design with STM32-comStick from HITEX

STM32-comStick is a HW/SW tool done by **HITEX**. It connects to PC USB port and through that makes available **STM32F107** HW resources.

The boards comes with **MICRIUM RTOS webserver** preinstalled.

Additional informations on:

www.hitex.com





Design with STM32-comStick from HITEX

The simplest thing to develop a new project with **STM32-comStick** from **HITEX** is to start from a working example provided by HITEX and then modify it.
In the next slides you will learn how to do it.

Suggestions:

Have a look on the following video guide:

HiTOP Universal user interface for all Hitex test and analysis tools

<http://www.hitex.com/index.php?id=551>

It explains in a clear and simple way HITEX IDE main functionalities.

Design with STM32-comStick from HITEX

Let's start with the following assumptions:

Use **STM** libraries **ver.3.1.0** available at this website:

<http://www.st.com/mcu/familiesdocs-110.html#Firmware>

As starting HITEX example we will use the following :

SYSTICK LED blinking application with GNU

available at this website:

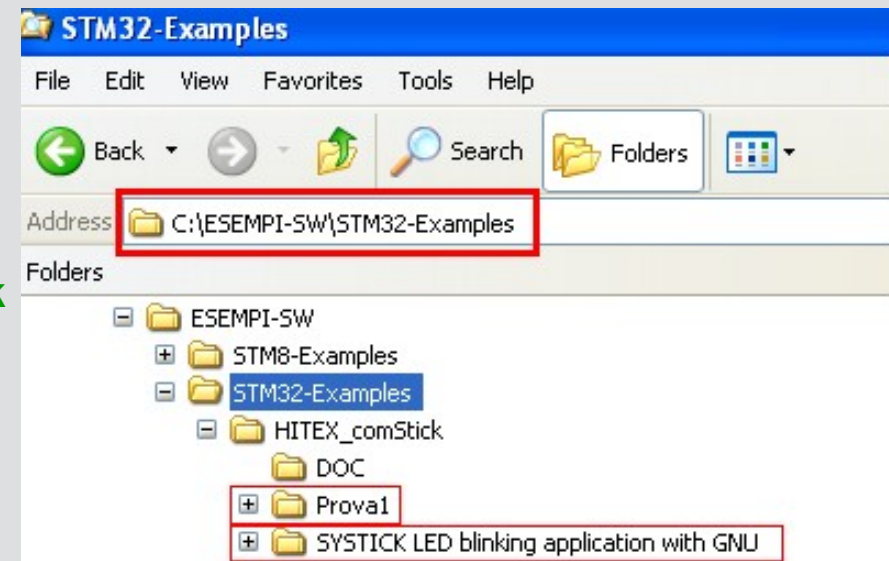
<http://www.hitex.com/index.php?id=1676>

Our working directory will be:

.../Prova1

Working directory structure will be:

...ESEMPI-SW/STM32-Examples/HITEX_comStick



Design with STM32-comStick from HITEX

STEP n.1

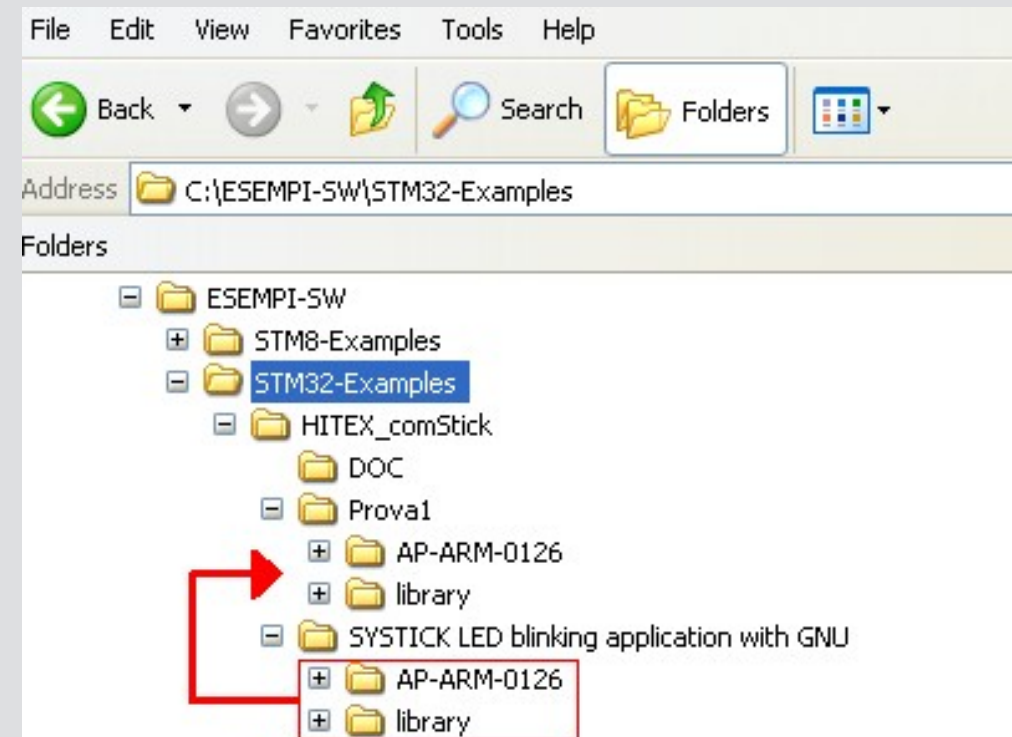
Copy the directories from this path:

C:\EEMPI-SW\STM32-Examples\HITEX_comStick\SYSTICK LED blinking application with GNU

To our working space:

Prova1

See picture beside for additional explanations



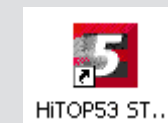
Design with STM32-comStick from HITEX

STEP n.2

Run **HiTOP53-STM32-comStick**

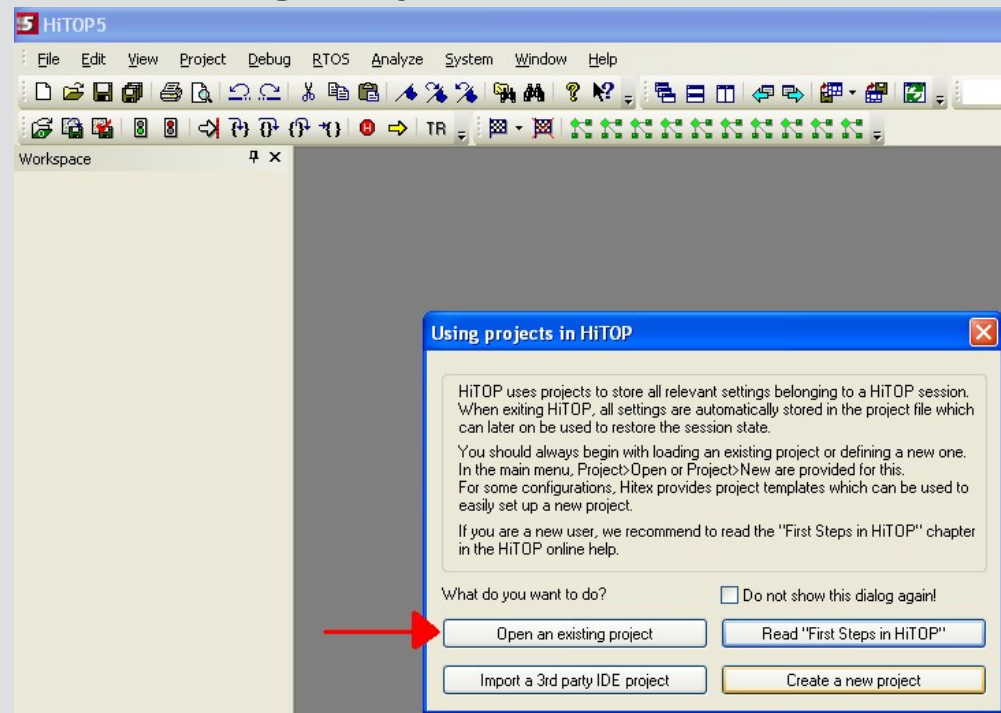
The page below should be displayed.

From this page click on: **Open an existing project**



NOTE:

STM32-comStick must be connected to the PC



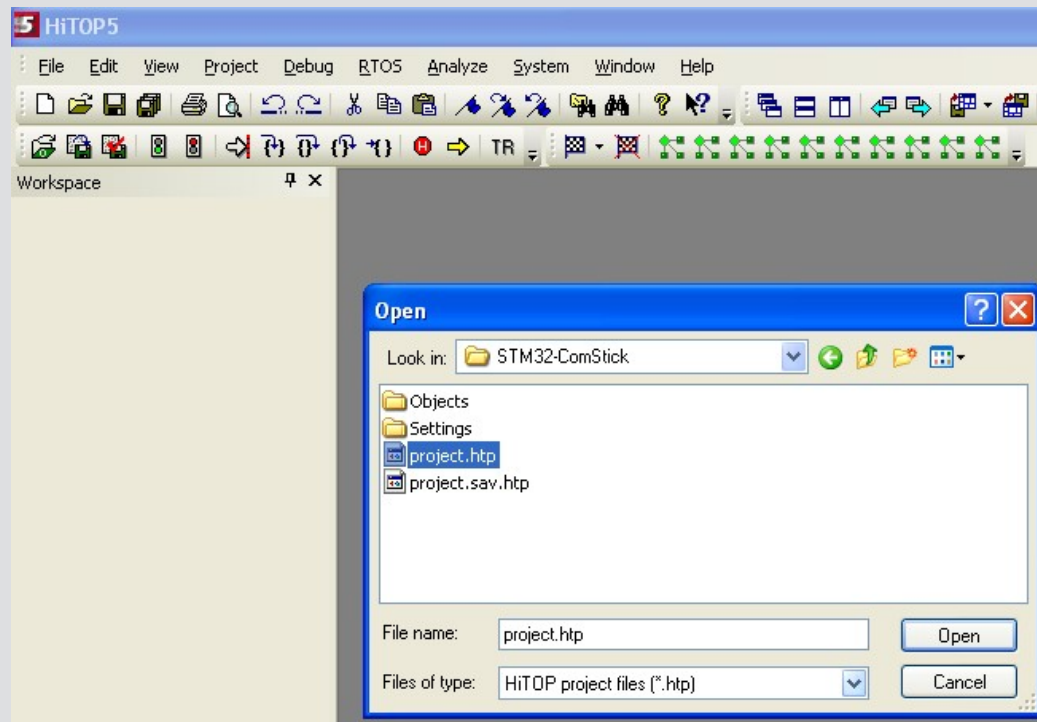
Design with STM32-comStick from HITEX

STEP n.2/Cont.

From the actual menu move into the following directory:

... \Prova1\AP-ARM-0126\HiTOP\STM32-ComStick

Select file ***project.htp*** and then click on **Open**.



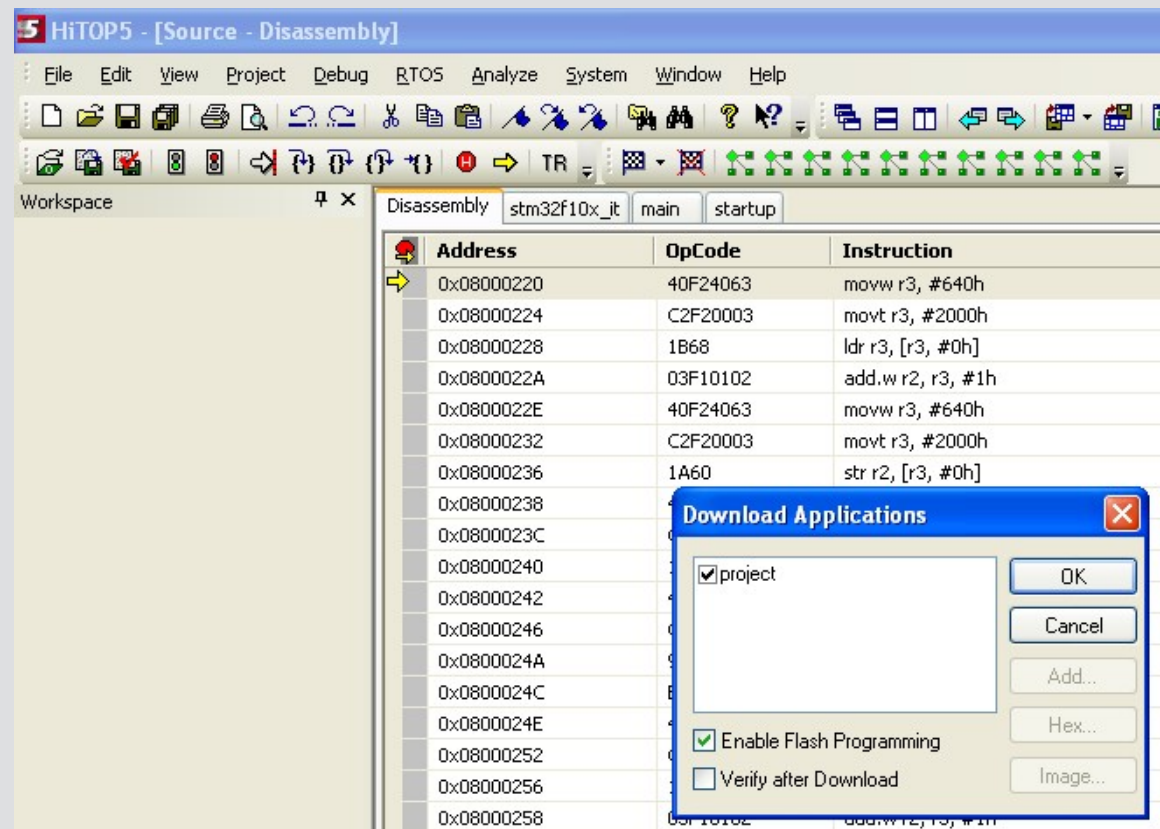
The first time you use the tool windows will appear which you should answer as shown below.

- 1) On the page that appears select **STM32-comStick** and press **NEXT**.
- 2) A new page will appear where you click on **press CONNECT**.
- 3) Again new page will appear where you click on **I WANT TO CONTINUE EVALUATION**.

Design with STM32-comStick from HITEX

STEP n.2/Cont.

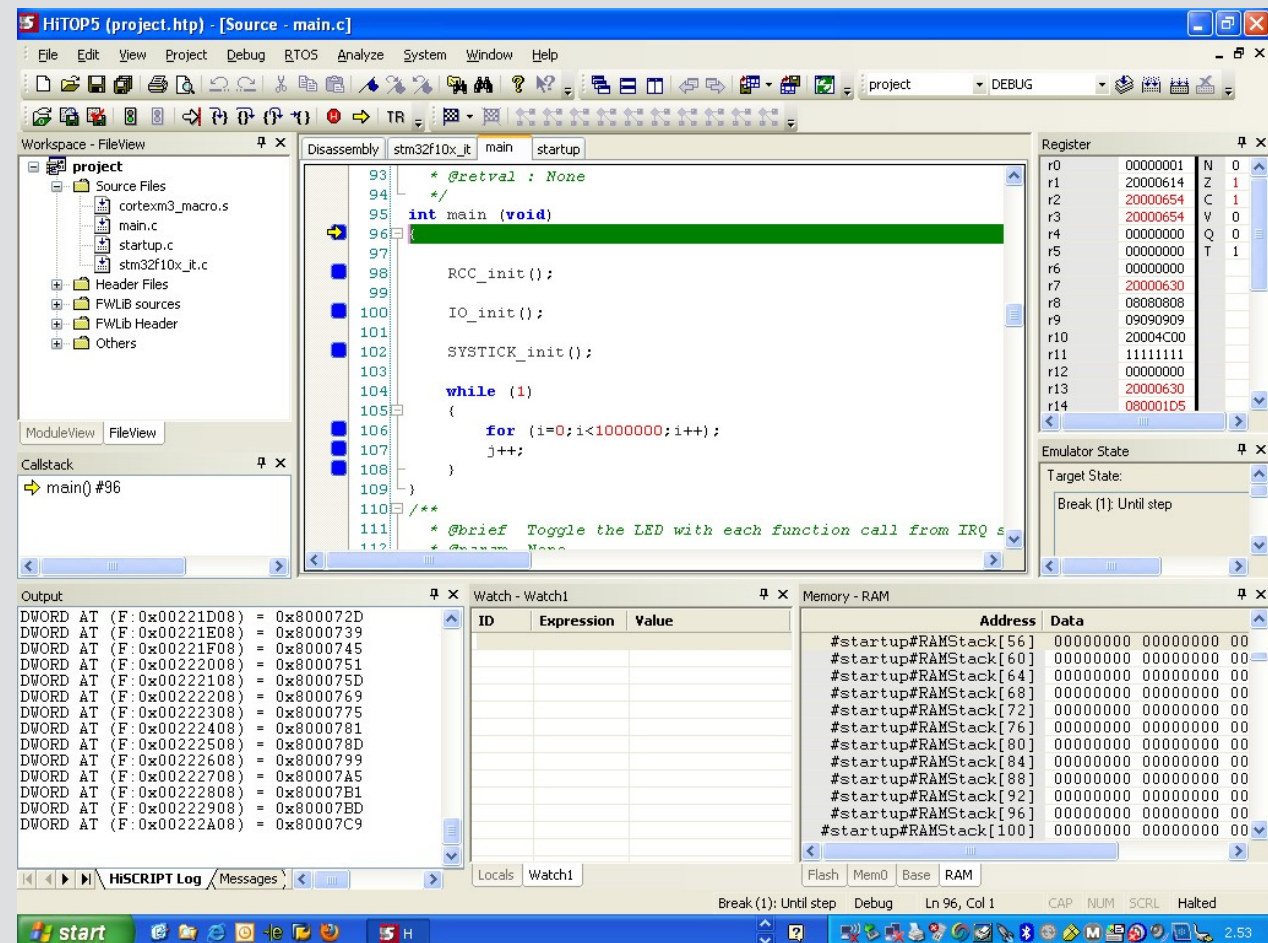
Now you should see the page below, **click on OK.**



Design with STM32-comStick from HITEX

STEP n.2/Cont.

If you did a good job
you should see a page
like this one



The screenshot displays the HITOP5 IDE interface for a project named 'HitTOP5 (project.http) - [Source - main.c]'. The main window shows the source code for 'main.c' with the following content:

```

93  * @retval : None
94  */
95  int main (void)
96  {
97      RCC_init();
98      IO_init();
99
100     SYSTICK_init();
101
102     while (1)
103     {
104         for (i=0;i<1000000;i++);
105         j++;
106     }
107 }
108
109 /**
110  * @brief Toggle the LED with each function call from IRQ s
111  * @param None
112  */

```

The interface includes several panels:

- Workspace - FileView:** Shows the project structure with Source Files (cortexm3_macro.s, main.c, startup.c, stm32f10x_it.c), Header Files, FWLIB sources, FWLIB Header, and Others.
- Disassembly:** Shows the assembly code for the 'main' function, corresponding to the source code above.
- Register:** Displays the current state of registers r0 through r14.
- Emulator State:** Shows the target state and a break point set at 'Break (1): Until step'.
- Output:** Displays the output of the program, showing memory addresses and values.
- Watch - Watch1:** A table for monitoring variables.
- Memory - RAM:** A table for monitoring memory addresses and data.

The status bar at the bottom indicates the program is running at 'Ln 96, Col 1' and is in a 'Halted' state.

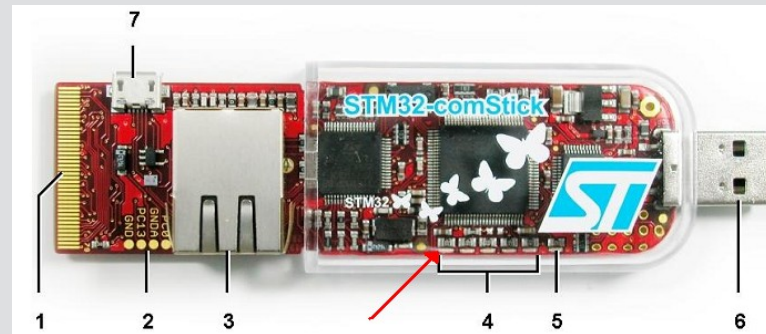
Design with STM32-comStick from HITEX

STEP n.3

To verify the application run it by clicking on this icon



If all OK, executing the program you should see the first orange led on the left blinking (see below, red arrow).



Now we will modify the program in order to:

- ***Use STM library only***
- ***Get all LED blinking***

Design with STM32-comStick from HITEX

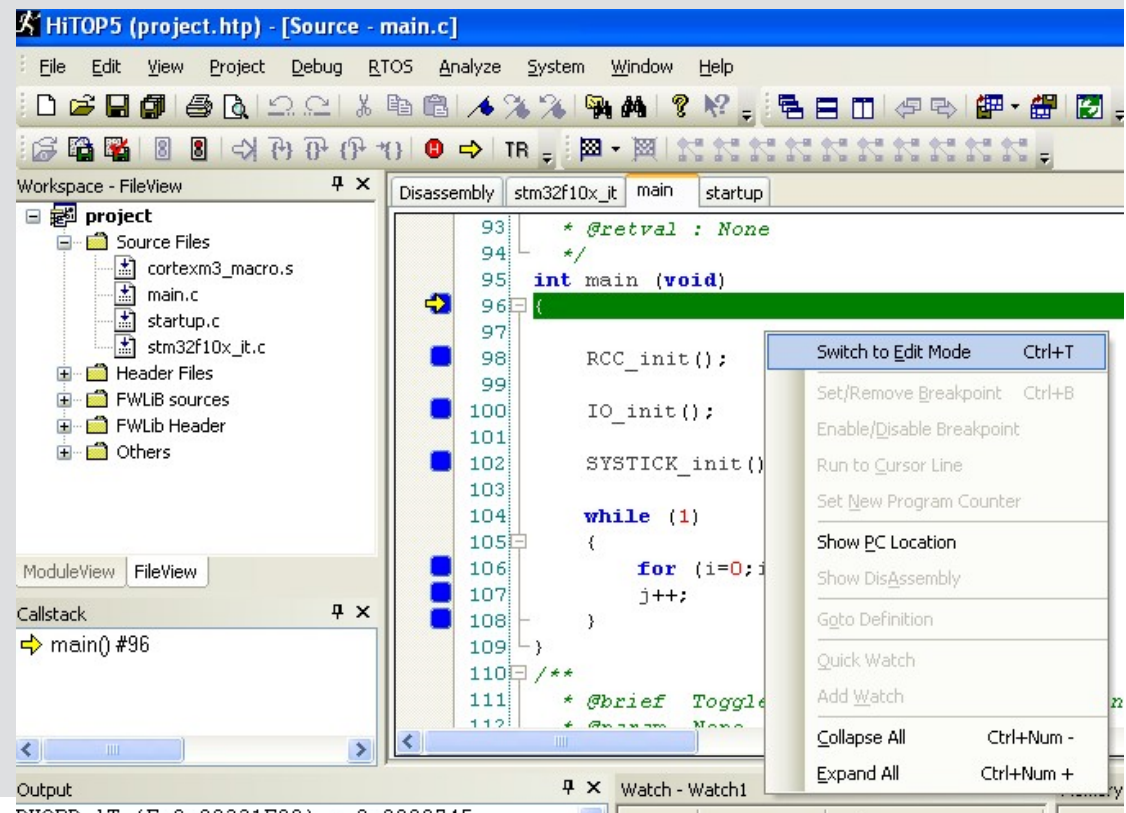
STEP n.3/Cont.



Before modification you have to stop program execution clicking on this icon

To enter in **editor** do a **right Click** inside the page containing C code and select

Switch to Edit Mode.



Design with STM32-comStick from HITEX

STEP n.4

HITEX application basically cover the following functions:

MCU Configuration

GPIO Configuration

CLOCK (RCC) Configuration

SYSTICK configuration

INTERRUPT (NVIC) configuration

ILed blinks when SYSTICK expires , this is managed via interrupt.

Interested files are:

main.c	Setup routines and main loops
tm32f10x_it.c	Interrupt vectors
stm32f10x_lib.c	Library definition module
stm32f10x_gpio.c	Library for GPIO module
stm32f10x_rcc.c	Library for RCC module
stm32f10x_systick.c	Library for SYSTICK module
stm32f10x_nvic.c	Library for NVIC module

Design with STM32-comStick from HITEX

STEP n.4/Cont.

Here are some other important files for MCU configuration:

main.h	General inclusions
stm32f10x_conf.h	Library configuration file
stm32f10x_lib.h	Library inclusions file
stm32f10x_type.h	Definitions and types
stm32f10x_it.h	Interrupt vector pre-declarations

Special note to file **stm32f10x_conf.h** . It provides peripheral enable/disable and set the system clock used to get USART desired baud rate.

Here are additional info on the files described above:

Application Example AE-CORTEX-0102.pdf

<http://www.hitex-download.de/examples/st/stm32-comstick/AE-CORTEX-0101.pdf>

Design with STM32-comStick from HITEX

STEP n.4/Cont.

To modify HITEX program we should know LED connections. To do this open STM32 data sheet included in STM32-comStick in this directory:
C:\Program Files\Hitex\HiTOP53-STM32-comStick\STM32-ComStickView\Doc
 File name:

stm32-io-board-ds.pdf

LED connection is done as follow:

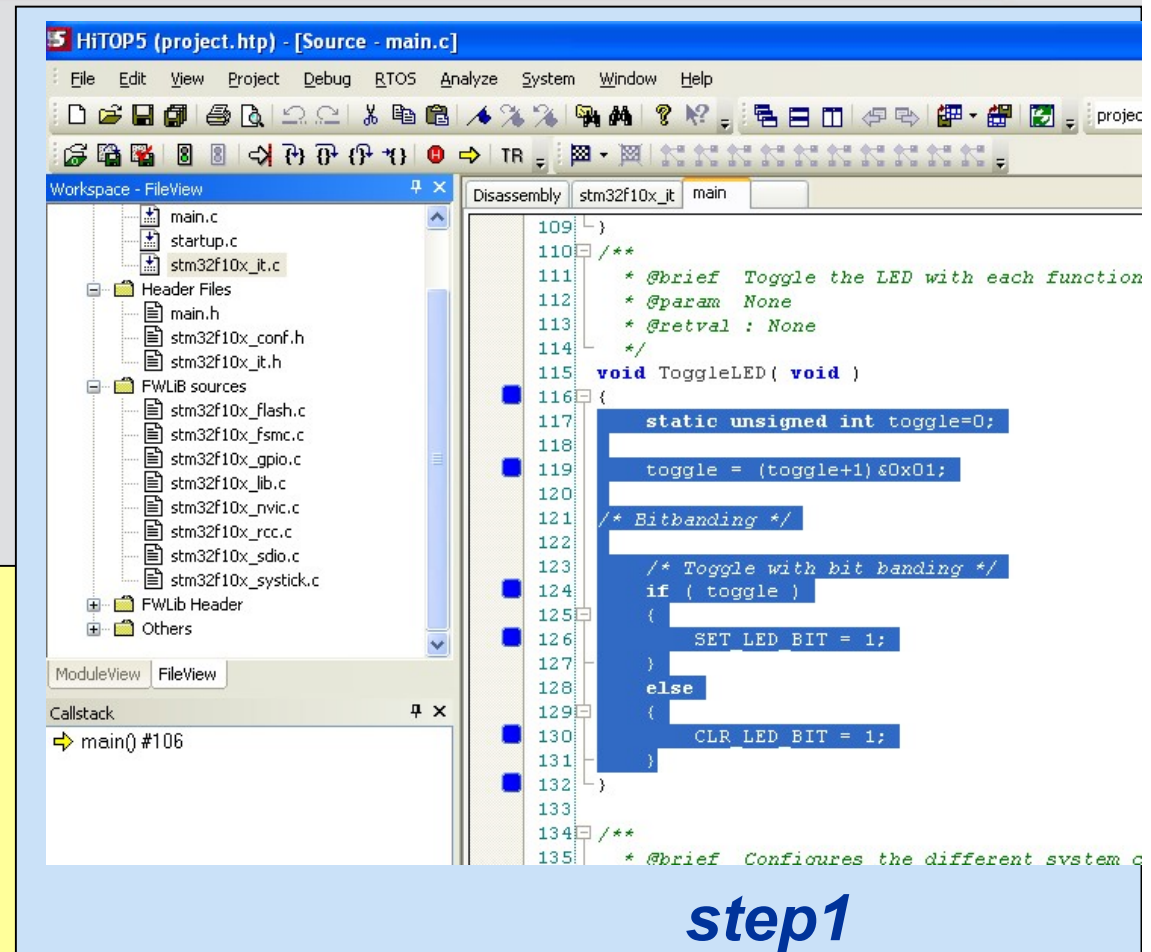
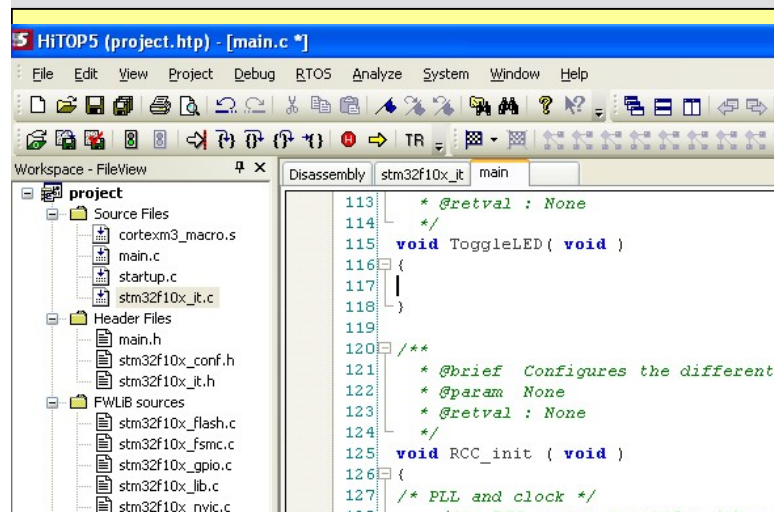
LEDs					
	V507	V506	V505	V504	V503
Port	PB1	PB0	PB9	PE15	PB5

Set the dsired port to 'high' in order to light up the corresponding LED.

Design with STM32-comStick from HITEX

STEP n.4/Cont.

Open file **main.c**
look at the function:
void ToggleLED(void)
And delete its content as
shown in step1 and
step2.



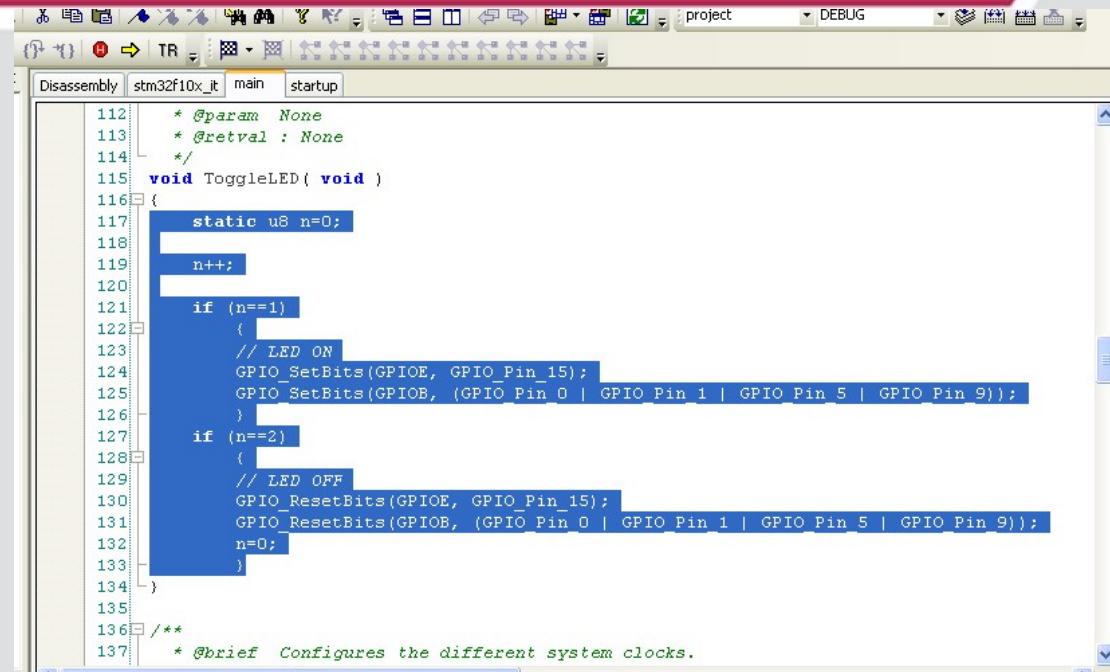
step2

Design with STM32-comStick from HITEX

STEP n.4/Cont.

the new function content for :
void ToggleLED(void)
Is the following.

```
static u8 n=0;
n++;
if (n==1)
{
    // LED ON
    GPIO_SetBits(GPIOE, GPIO_Pin_15);
    GPIO_SetBits(GPIOB, (GPIO_Pin_0 | GPIO_Pin_1 | GPIO_Pin_5 | GPIO_Pin_9));
}
if (n==2)
{
    // LED OFF
    GPIO_ResetBits(GPIOE, GPIO_Pin_15);
    GPIO_ResetBits(GPIOB, (GPIO_Pin_0 | GPIO_Pin_1 | GPIO_Pin_5 | GPIO_Pin_9));
    n=0;
}
```



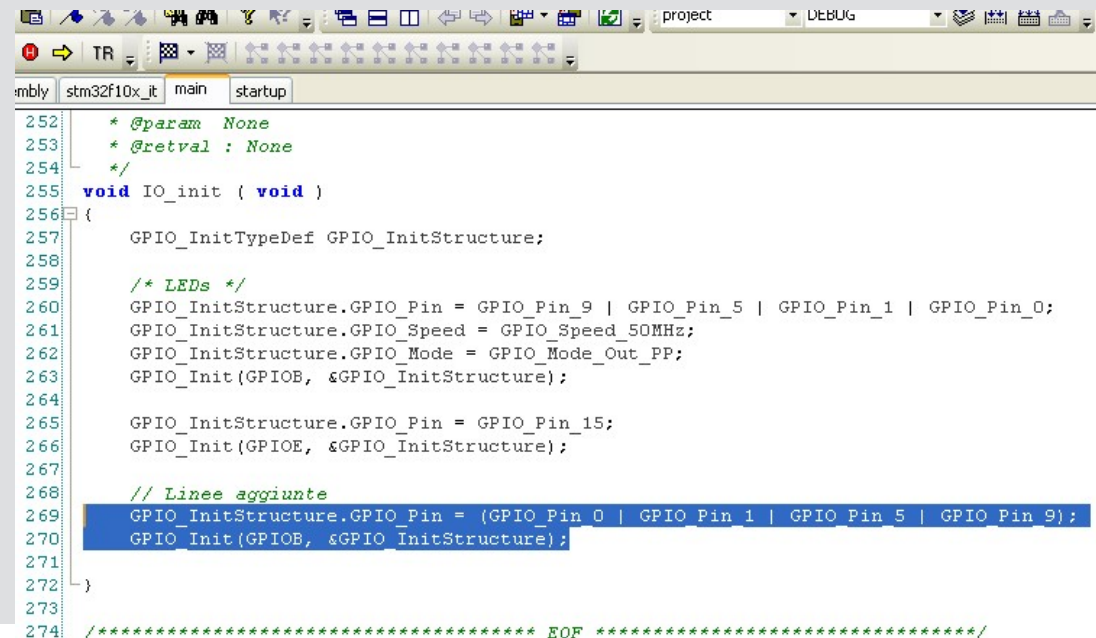
```
112  * @param None
113  * @retval : None
114  */
115  void ToggleLED( void )
116  {
117      static u8 n=0;
118      n++;
119      if (n==1)
120      {
121          // LED ON
122          GPIO_SetBits(GPIOE, GPIO_Pin_15);
123          GPIO_SetBits(GPIOB, (GPIO_Pin_0 | GPIO_Pin_1 | GPIO_Pin_5 | GPIO_Pin_9));
124      }
125      if (n==2)
126      {
127          // LED OFF
128          GPIO_ResetBits(GPIOE, GPIO_Pin_15);
129          GPIO_ResetBits(GPIOB, (GPIO_Pin_0 | GPIO_Pin_1 | GPIO_Pin_5 | GPIO_Pin_9));
130          n=0;
131      }
132  }
133  /**
134  * @brief Configures the different system clocks.
```

Design with STM32-comStick from HITEX

STEP n.4/Cont.

search for function **void IO_init (void)** and add the following lines:

```
GPIO_InitStructure.GPIO_Pin = (GPIO_Pin_0 | GPIO_Pin_1 | GPIO_Pin_5 | GPIO_Pin_9);  
GPIO_Init(GPIOB, &GPIO_InitStructure);
```



```
252  * @param None  
253  * @retval : None  
254  */  
255  void IO_init ( void )  
256  {  
257      GPIO_InitTypeDef GPIO_InitStructure;  
258  
259      /* LEDs */  
260      GPIO_InitStructure.GPIO_Pin = GPIO_Pin_9 | GPIO_Pin_5 | GPIO_Pin_1 | GPIO_Pin_0;  
261      GPIO_InitStructure.GPIO_Speed = GPIO_Speed_50MHz;  
262      GPIO_InitStructure.GPIO_Mode = GPIO_Mode_Out_PP;  
263      GPIO_Init(GPIOB, &GPIO_InitStructure);  
264  
265      GPIO_InitStructure.GPIO_Pin = GPIO_Pin_15;  
266      GPIO_Init(GPIOE, &GPIO_InitStructure);  
267  
268      // Linee aggiunte  
269      GPIO_InitStructure.GPIO_Pin = (GPIO_Pin_0 | GPIO_Pin_1 | GPIO_Pin_5 | GPIO_Pin_9);  
270      GPIO_Init(GPIOB, &GPIO_InitStructure);  
271  }  
272  
273  
274  /***** EOF *****/
```

Design with STM32-comStick from HITEX

STEP n.4/Cont.

To compile the program click on this icon

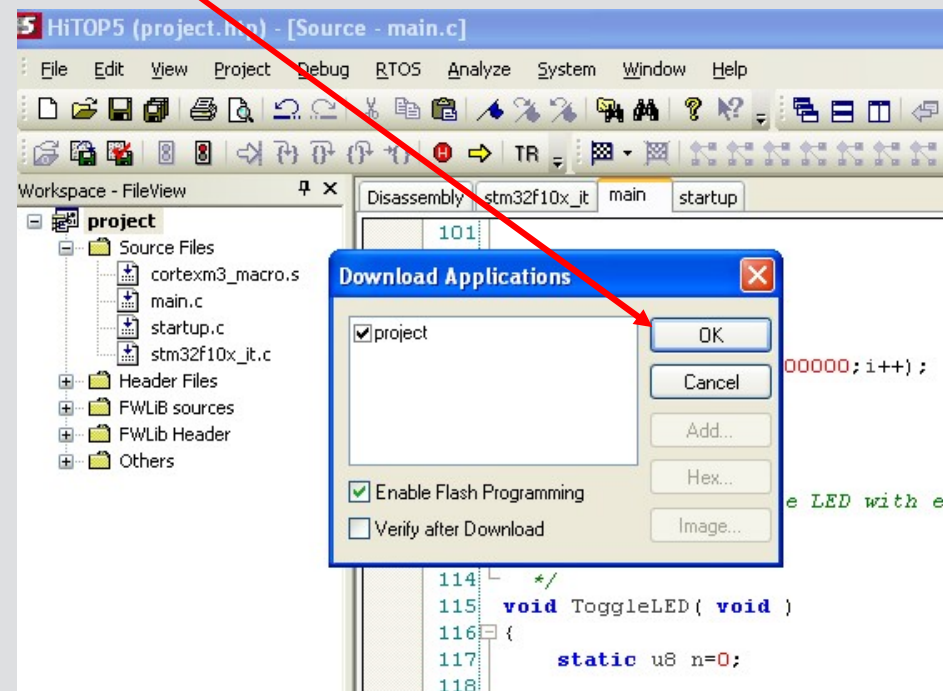


If everything is OK you should see the following on the screen.

Click on **OK** and you will execute the program



All LED should blink.

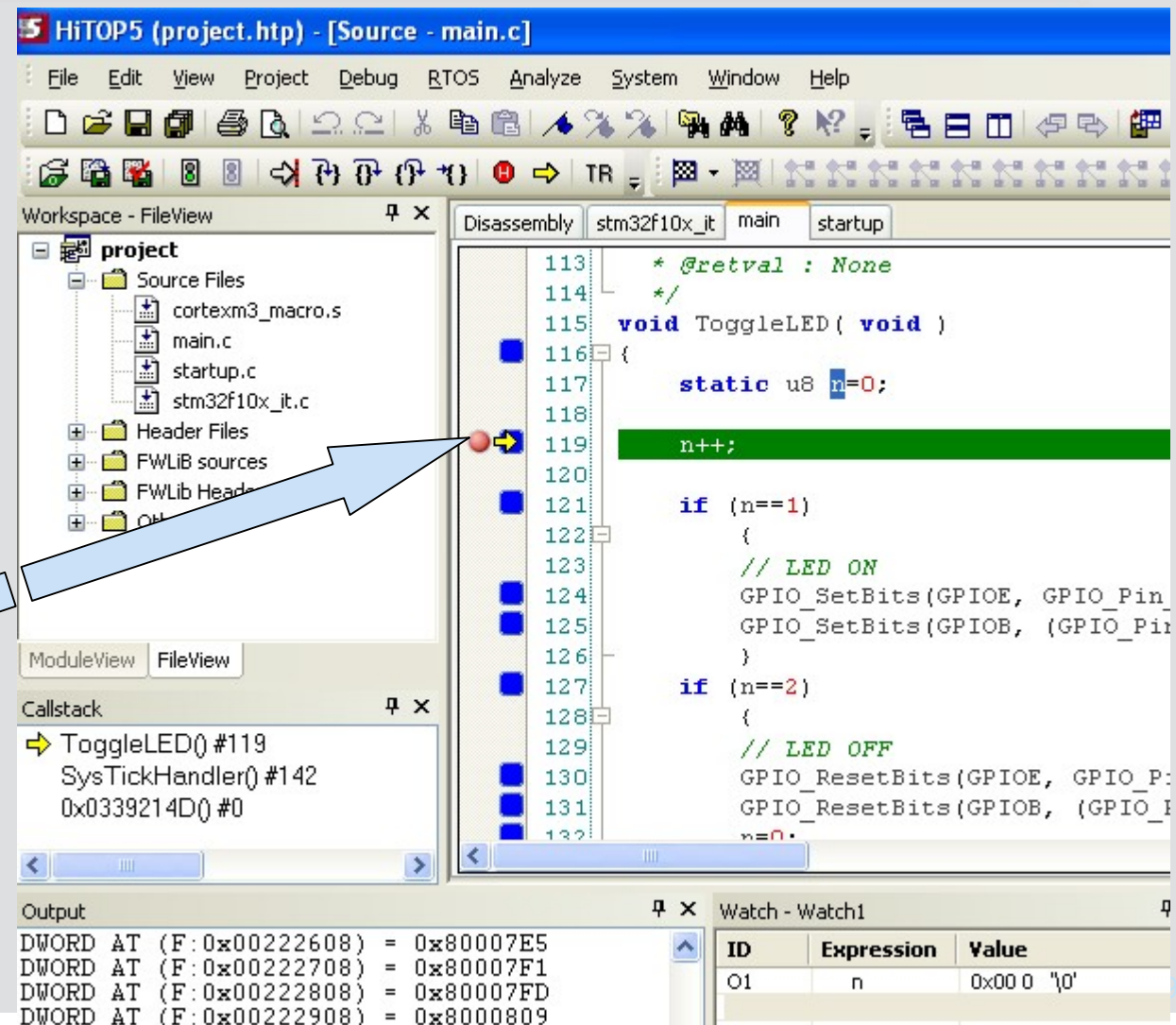


Design with STM32-comStick from HITEX

BreakPoint

To set a B.P. move
on the interested code
line and left click with
the mouse.

The red mark will
indicate Breakpoint is
set.

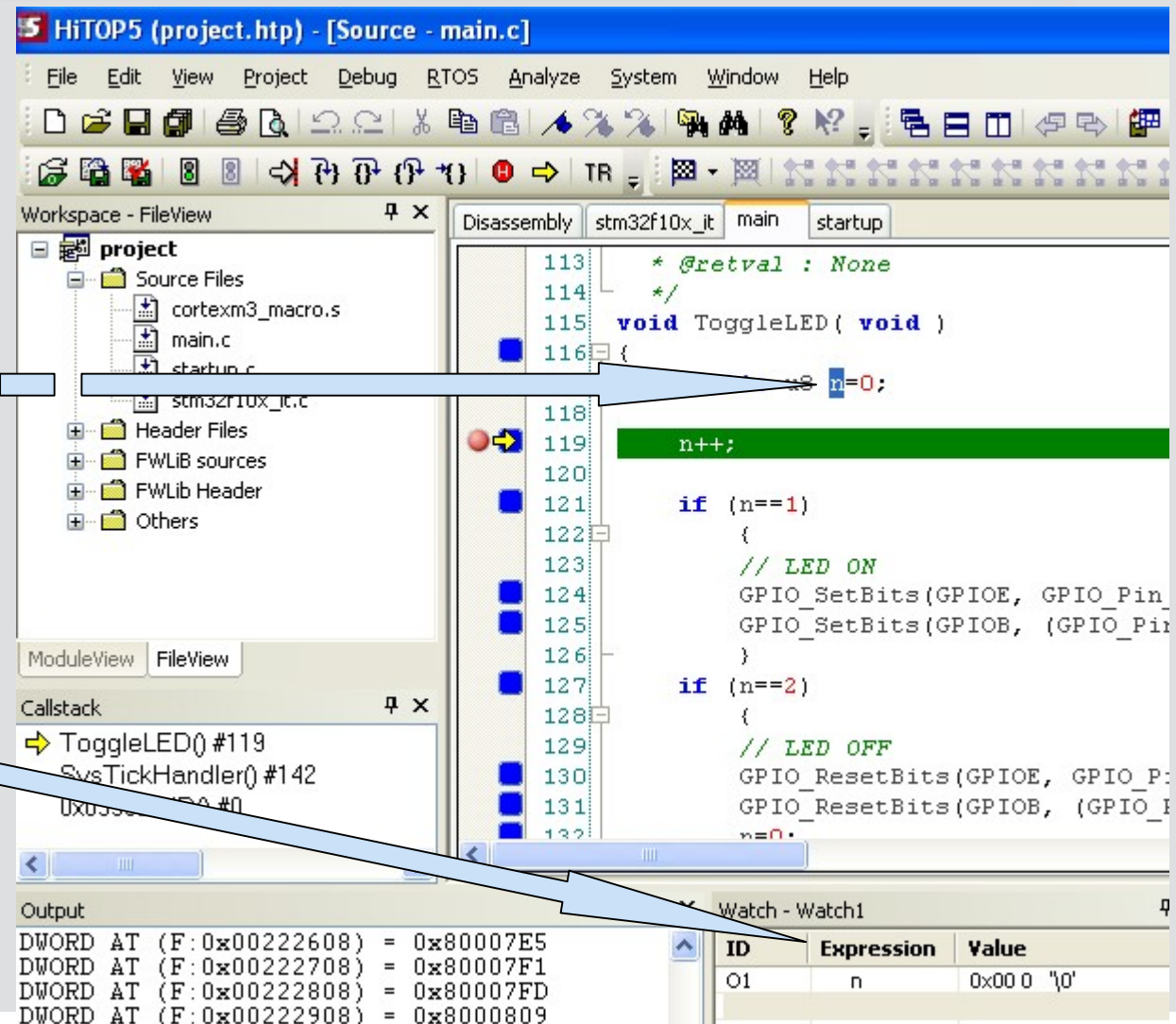


Design with STM32-comStick from HITEX

Watch Variables

To put variables in the Watch Window just select them, right click mouse and chose Add Watch.

Variable will appear in the watch window



The screenshot shows the HiTOP5 IDE interface. The main window displays the source code for `main.c` in the `stm32f10x_it` project. The code includes a `ToggleLED` function that toggles an LED. The `Watch` window at the bottom right shows the variable `n` with a value of `0x00000000`. The `Callstack` window shows the current function call as `ToggleLED() #119`.

Source Code Snippet:

```

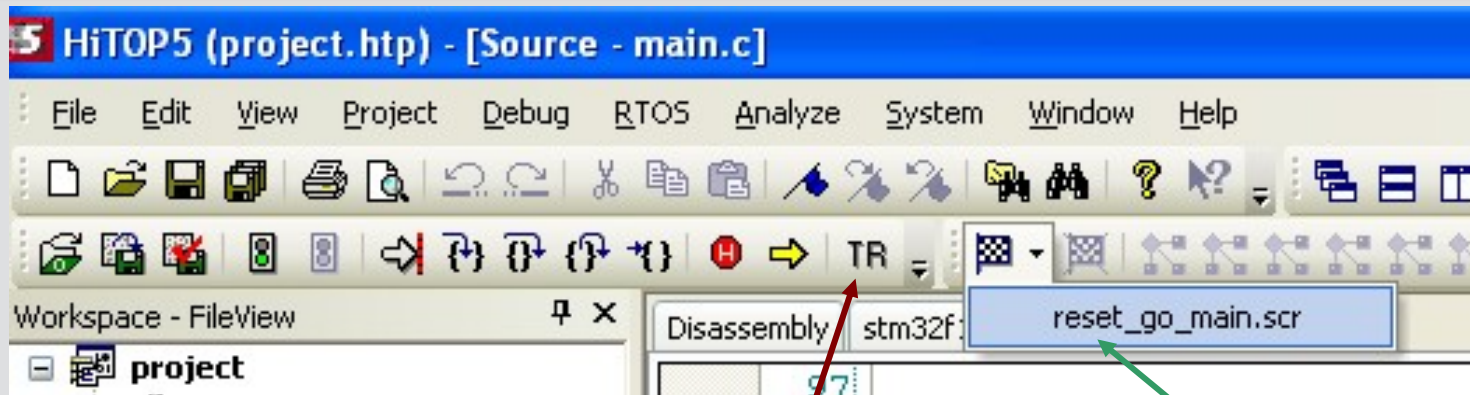
113  * @retval : None
114  */
115  void ToggleLED( void )
116  {
117      n=0;
118
119      n++;
120
121      if (n==1)
122      {
123          // LED ON
124          GPIO_SetBits(GPIOE, GPIO_Pin_
125          GPIO_SetBits(GPIOB, (GPIO_Pin
126      )
127      if (n==2)
128      {
129          // LED OFF
130          GPIO_ResetBits(GPIOE, GPIO_P
131          GPIO_ResetBits(GPIOB, (GPIO_I
132          n=0;

```

Watch Window:

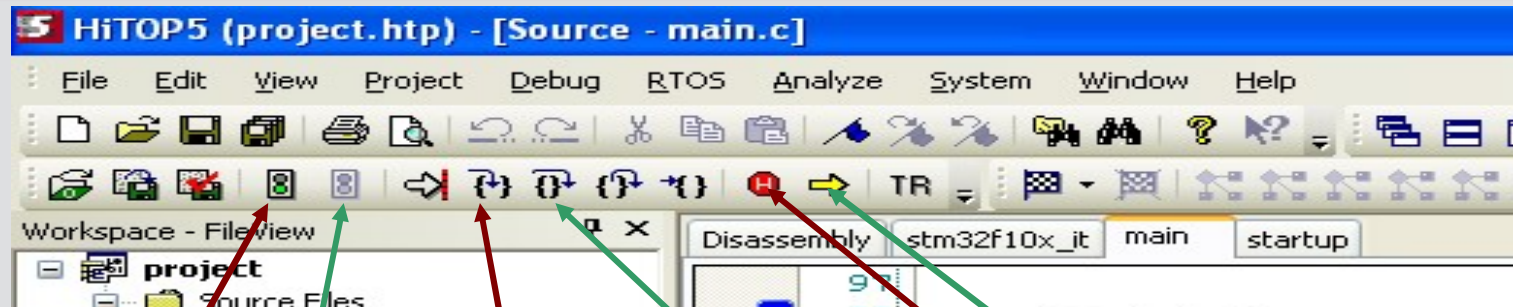
ID	Expression	Value
O1	n	0x00000000

Design with STM32-comStick from HITEX



Reset works on the MCU initialization routine
Execute Script, click on low arrow, this makes MCU reset.

Design with STM32-comStick from HITEX



StepInto

StepOver

STOP stop program execution

RUN run program from actual Program Counter content

Set/Remove BrakPoint on the line where cursor is.

Show PC move cursor to line code pointed by Program Counter

ST-MCU

<http://www.st.com/mcu/index.html>

STM32

<http://www.st.com/mcu/inchtml-pages-stm32.html>

Documents and files for family STM32

<http://www.st.com/mcu/familiesdocs-110.html>

STM32 for motor control

<http://www.st.com/mcu/inchtml-pages-stm32mc.html>

MCU Training & Seminars

http://www.st.com/mcu/inchtml-pages-mcu_train.html

Product Brochures & Selectors

http://www.st.com/stonline/products/promlit/p_microcontrollers.htm

Example for STM32

<http://emcu.altervista.org/>