

## Z8051<sup>™</sup> Family of 8-Bit Microcontrollers

# **Z51F0811 Evaluation Kit**

**User Manual** 

UM024205-1012



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# **Revision History**

Each instance in the Revision History table below reflects a change to this document from its previous version.

Date	Revision Level	Description	Page
Sep 2012	05	Updates for Z8051 Installation Software release 2.0.	<u>17, 23,</u> <u>30, 43</u> – <u>44</u>
Apr 2012	04	Updated for improved usability.	All
Mar 2012	03	Corrected formatting issue.	n/a
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## Introduction

This manual describes how to set up Zilog's Z51F0811 Evaluation Kit (Zilog part number Z51F0811000KITG) and use it to evaluate your Z8051-based designs and applications.

The Kit features a small Evaluation Board consisting of four LEDs, three pushbuttons, port pin headers and a UART-to-USB port. The Board features the Z51F0811 MCU in a 32-pin QFN package, plus a DBG connector to connect the board to a host development PC using the Z8051 USB On-Chip Debugger (OCD) cable. For more details about the Z51F0811 MCU, please refer to the Z51F0811 Product Specification (PS0296).

This document guides you through the following tasks:

- Install the Z8051 OCD Software and Documentation see page 5
- <u>Configure the Z8051 OCD and Z51F0811 Evaluation Board</u> see page 15
- Build and Run the Z51F0811 Demo Project see page 17

Figure 1 displays an image of the Z51F0811 Evaluation Kit.



Figure 1. The Z51F0811 Evaluation Kit

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### **Kit Contents**

Table 1 lists the contents of the Z51F0811 Evaluation Kit.

Table 1.	Z51F0811000KITG	Contents
----------	-----------------	----------

ltem	Description	Quantity
1	Z51F0811 Evaluation Board	1
2	Z8051 USB On-Chip Debugger (OCD)	1
3	Z8051 OCD Target Cable (10ckt)	1
4	USB Cable: A (male) to Mini-B	2
5	Z8051 OCD Software and Documentation CDROM	1
6	Z51F0811 Evaluation Kit Insert (FL0138)	1

Figure 2 displays an image of the Z51F0811 Evaluation Board.

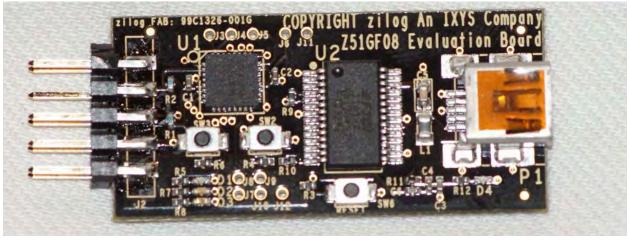


Figure 2. Z51F0811 Evaluation Board

## **Supported Operating Systems**

The Z51F0811 Evaluation Board and the Z8051 On-Chip Debugger support the following operating systems:

- Microsoft Windows XP
- Microsoft Windows Vista (32-bit/64-bit)



• Microsoft Windows 7 (32-bit/64-bit)

## **Z51F0811 Evaluation Board Block Diagram**

Figure 3 displays a block diagram of the Z51F0811 Evaluation Board.

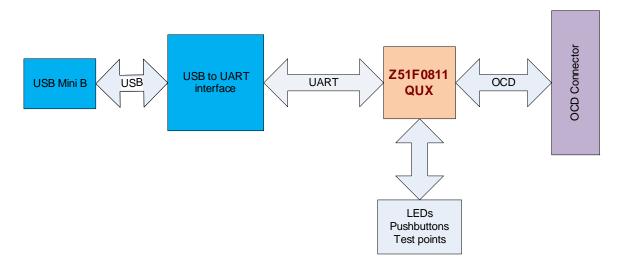


Figure 3. Block Diagram of the Z51F0811 Evaluation Board

## **Z51F0811 Evaluation Board Description**

The Z51F0811 Evaluation Board contains the following components:

- Z51F0811: U1, 32-pin QFN chip
- 3 LEDs: green (D1), red (D2) and yellow (D3) are connected to the GPIO pins of the Z51F0811 MCU
- 1 green LED to indicate USB power: D4
- 3 pushbuttons:
  - SW1: RESET
  - SW2 and SW3 are connected to the GPIO pins on the Z51F0811 MCU
- USB connector: P1
- OCD connector: J1, J2
- USB to UART interface: U2



- USB interface provides power and communication to the Board
- Test points J11 and J12 are connected to Ground; J3–J10 are connected to GPIO pin U1

When the Board is connected to the USB port of the host PC, the green D4 LED will illuminate (turn ON).

Schematic diagrams of the Z51F0811 Evaluation Board are presented <u>on pages 35 through</u> <u>36</u> of this document.

The physical dimensions of the Board are: 1.61" x 0.76" (40.9mm x 19.3mm).



# Install the Z8051 OCD Software and Documentation

The Z8051 On-Chip Debugger (OCD) interface is the interface by which your PC will communicate with the Z51F0811 MCU to download and execute code. In addition to the OCD, software such as development tools and sample applications will be installed.

**Note:** If you have already installed the Z8051 software and documentation from the CD-ROM following the procedure on the paper insert in your kit (FL0138), skip this section and proceed to the Z8051 OCD Driver Installation section, below.

Observe the following procedure to install the Z8051 On-Chip Debugger software and documentation on your computer.

- 1. Ensure that the OCD interface hardware is not connected to your PC.
- 2. Insert the Z8051 Software and Documentation CD into your computer's CD-ROM drive. The setup program launches automatically. If the setup program does not launch automatically, open Windows Explorer, browse to your CD-ROM drive, and double-click the file labeled Z8051\_<version\_number>.exe.

**Note:** In this filename, <version\_number> refers to the version number of the OCD Software and Documentation release. For example, this version number may be 1.0.

3. Follow the on-screen instructions to complete the OCD software installation.

#### **Z8051 OCD Driver Installation**

The driver programs for the Z8051 On-Chip Debugger are copied during the software and documentation installation. In the following procedure for PCs running Windows 7 32- and 64-bit operating systems, ensure that the target side of the OCD will remain unconnected while you install these drivers.

Note: If you are running Windows Vista, see <u>Appendix A</u> on page 37 to install your device drivers. If you are running Windows XP, see <u>Appendix B</u> on page 40.

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- 1. Connect the OCD hardware to the USB port of your PC by connecting the A (male) end of one of the two USB A (male)-to-Mini-B cables with the host PC's USB port. Connect the Mini-B end to the OCD device.
- 2. After the PC detects the new hardware, it will display the *Installing device driver software* dialog shown in Figure 4.

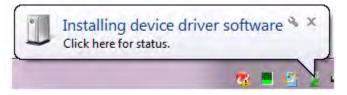


Figure 4. Install Device Driver Dialog, Windows 7

**IMPORTANT NOTE:** If you should encounter the scenarios presented in Figures 8 or 9, right-click your mouse on **ZILOG OCD I/F** (highlighted in Figure 8) or **Unknown device** (highlighted in Figure 9) and select **Update Driver Software...** 

- 3. Select **Browse my computer for driver software (advanced)** to display the dialog shown in Figure 5, which prompts you to key in or browse for the location of the .inf file. Depending on the type of computer you use (32- bit or 64-bit), use the **Browse** button to navigate to one of the following paths, then click the **Next** button.
  - On 32-bit machines, use the following path:

<Z8051 Installation>\Z8051\_<version\_number>\device drivers\OCD USB\x32

- On 64-bit machines, use the following path:

<Z8051 Installation>\Z8051\_<version\_number>\device drivers\OCD USB\x64



Found New Hardware - ZILOG OCD I/F Browse for driver software on your computer		9	
Search for driver software in this location:			
C:\Program Files\Zilog\Z8051_1.0\device drivers\OCD USB\x32	-	Browse	

Figure 5. Browse For Driver Dialog, Windows Vista



4. When Windows prompts you whether to install or not install, as shown in Figure 6, click **Install this driver software anyway** and wait until the installation is completed (Windows may prompt you more than once).



Figure 6. Can't Verify Publisher Dialog, Windows Vista



5. When the installation is complete, the screen shown in Figure 7 will appear. Click **Close** to exit the OCD driver installation.

G I Found New H	ardware - Zilog Z8051 USB OCD
The software fo	r this device has been successfully installed
Windows has finishe	ed installing the driver software for this device:
Zilog Z80	51 USB OCD
	Close

Figure 7. Successfully Installed Dialog, Windows Vista

**Note:** On some installations, the Found New Hardware screen shown in Figure 7 may also display the text string, Zilog Z8051 USB OCD - No Firmware. This occurrence is normal and can be disregarded.

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Device Manager	
le Action View Help	
🚔 bpak-b7yc8n1	
Batteries	
Bluetooth Radios	
▶ 📲 Computer	
Disk drives	
🔈 🖳 Display adapters	
DVD/CD-ROM drives	
Human Interface Devices	
> Car IDE ATA/ATAPI controllers	
🕨 🚋 IEEE 1284.4 compatible printer	
> 拱 IEEE 1284.4 devices	
🗼 🐺 IEEE 1394 Bus host controllers	
🖟 🚟 Imaging devices	
> - Keyboards	
> 🖞 Mice and other pointing devices	
Monitors	
Network adapters	
Other devices	
HEWLETT-PACKARD DESKJET 990C	
TILOG OCD I/F	
Portable Devices	
Ports (COM & LPT)	
Processors	
Sound, video and game controllers	
System devices	
a 🏺 Universal Serial Bus controllers	
Generic USB Hub	
Generic USB Hub	
🏺 Generic USB Hub	
🖗 Generic USB Hub	
- 🖗 Generic USB Hub	
🛱 HP Color LaserJet 2840 EWS	
🏺 Intel(R) 5 Series/3400 Series Chipset Family	USB Enhanced Host Controller - 3B34
🚽 🟺 Intel(R) 5 Series/3400 Series Chipset Family	USB Enhanced Host Controller - 3B3C
USB Composite Device	(
🟺 USB Composite Device	The software was not successfully installed *
USB Composite Device	Click here for details.

Figure 8. Unsuccessful Installation, Scenario 1

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Device Manager	2
le <u>A</u> ction <u>V</u> iew <u>H</u> elp	
bpak-b7yc8n1	
🔉 🎲 Batteries	
p 🚯 Bluetooth Radios	
⊳ ₁щ Computer	
👂 👝 Disk drives	
🔈 📲 Display adapters	
DVD/CD-ROM drives	
🔈 🕼 Human Interface Devices	
IDE ATA/ATAPI controllers	
🔉 🚛 IEEE 1284.4 compatible printer	
> 🚛 IEEE 1284.4 devices	
🔉 - 🟺 IEEE 1394 Bus host controllers	
🔉 🚟 Imaging devices	
> - Keyboards	
Mice and other pointing devices	
b - See Monitors	
Network adapters	
A by Other devices	
HEWLETT-PACKARD DESKJET 990C	
Portable Devices	
Ports (COM & LPT)	
Processors	
Sound, video and game controllers	
⊳ d∰ System devices	
🖌 🏺 Universal Serial Bus controllers	
🟺 Generic USB Hub	
— 🐙 Generic USB Hub	
🚽 💗 Generic USB Hub	
💗 Generic USB Hub	
🚽 🖳 🤠 Generic USB Hub	
🟺 HP Color LaserJet 2840 EWS	
🚽 🚽 Intel(R) 5 Series/3400 Series Chipset Family USB Enhanced Host Controller - 3B34	
📮 Intel(R) 5 Series/3400 Series Chipset Family USB Enhanced Host Controller - 3B3C	
USB Composite Device	
USB Mass Storage Device	
USB Root Hub	
USB Root Hub	

Figure 9. Unsuccessful Installation, Scenario 2



6. If *Zilog Z8051 USB OCD* appears in the Device Manager (as highlighted in Figure 10), the OCD driver software has been successfully installed.

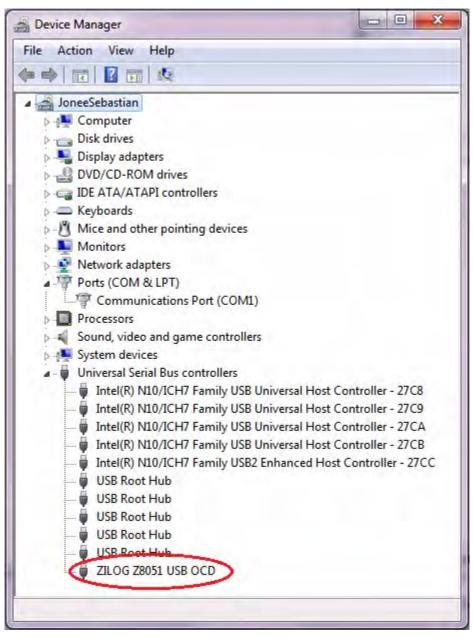


Figure 10. Device Manager Dialog, Windows 7



### **FTDI USB-to-UART Driver Installation**

An FTDI USB-to-UART driver is required to allow your PC to communicate through its USB port to the on-chip UART of the Z51F0811 MCU. Observe the following procedure to perform these connections.

- 1. Ensure that the USB cable is not plugged in to the Z51F0811 Evaluation Board's P1 connector.
- 2. Navigate to the following filepath and double-click the CDM20802\_setup.exe file to begin the driver installation.

<Z8051 Installation>\Z8051\_<version\_number>\device drivers\FTDI Uart

3. The installation process will begin and you should observe output similar to the following messages on the screen of your PC:

```
32-bit OS detected
<installation path>\dpinstx86.exe
Installation driver
FTDI CDM driver installation process completed.
```

**Note:** The above message may appear for a short time, but will then disappear from your window. This occurrence is normal.

- 4. When the installation is complete, plug in the Mini-B connector of the second USB cable into the Board, and the larger A connector into the USB port of your PC. Refer to Figure 14 on page 16 for guidance.
- 5. If the driver installation was successful, the *Ports (COM & LPT)* section of the Device Manager will display *USB Serial Port (COMx)* or similar message, as highlighted in Figure 11.

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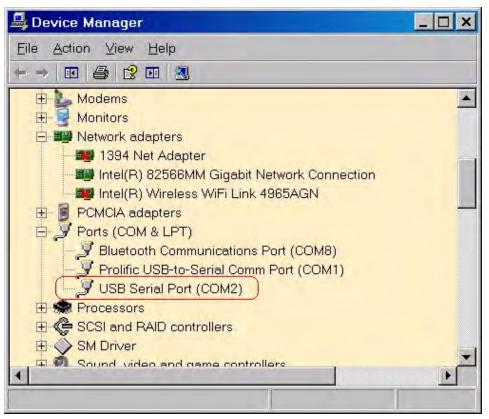


Figure 11. A Successful USB-to-UART Driver Installation

**Note:** To launch the Device Manager on Windows 7 systems, launch the Start menu, enter *device manager* in the **Search programs and files** field, and press the Enter key.

To open the Device manager on earlier Windows systems, navigate via the following path:

Start  $\rightarrow$  Control Panel  $\rightarrow$  System  $\rightarrow$  Hardware  $\rightarrow$  Device Manager  $\rightarrow$  Ports (COM& LPT)



# Configure the Z8051 OCD and Z51F0811 Evaluation Board

Observe the following procedure to set up and configure the Z8051 On-Chip Debugger and the Z51F0811 Board.

 $\wedge$ 

**Caution:** Steps number 1 to 4 present the power-up sequence. Carefully follow these steps to avoid encountering an improper connection or disconnection.

- 1. Connect the Z8051 On-Chip Debugger (OCD) to the host PC's USB port.
- 2. Connect one end of the 10-circuit cable to the Z8051 OCD.
- 3. Connect the other end of the 10-circuit cable connector to the Z51F0811 Board's J1 and J2 connectors. Pin 1 of the cable connector is indicated by a red stripe, as shown in Figure 12.

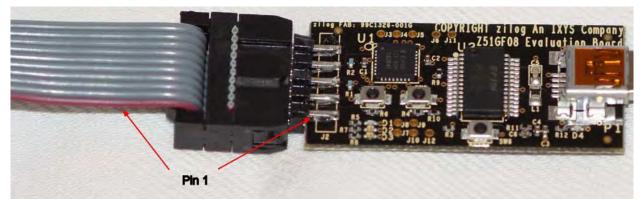


Figure 12. Connecting the 10-Circuit Cable to the Board

- 4. Using the second USB-to-Mini-B cable, connect the standard USB end to the host PC's USB port.
- 5. Connect the other end of this second Mini-B cable to the Z51F0811 Board's P1 connector to apply power to the Board. Note that the green LED D4 is ON; see Figure 13.

Figure 14 shows an example of a completed hardware and software setup.



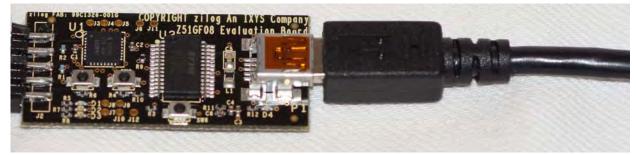


Figure 13. Connecting the USB Mini-B Cable to the Board

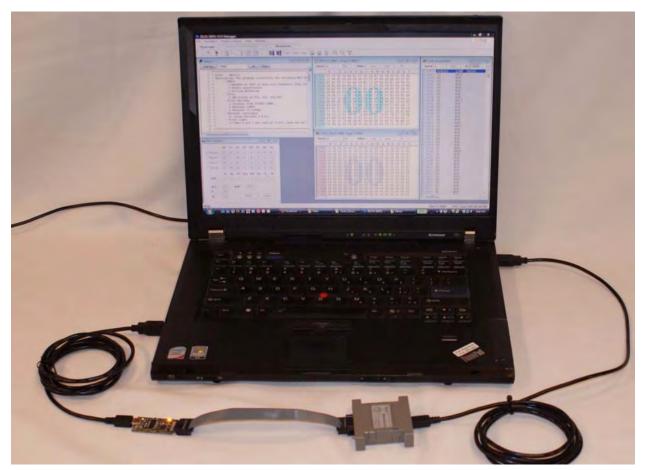


Figure 14. An Example Setup

## Build and Run the Z51F0811 Demo Project

Observe the following procedure to build and run the Z51F0811 demo project.

Note: If you plan to use the Keil µVision IDE, please skip to the Using the Keil µVision IDE on a Demo Project section on page 23.

1. Browse to the following location and double-click the build\_sdcc.bat batch file to build the project:

<Z8051 Installation>\Z8051\_<version\_number>\samples\Z51F0811\Demo\build\_sdcc.bat

**Note:** Refer to the <u>Z8051 Tools Product User Guide (PUG0033)</u> for additional information about these project files and Small Device C Compiler (SDCC) development tools.

2. When the build is complete, the command window will prompt the user to press any key to continue. Proceed by pressing any key on your keyboard; as a result, a hex file for the demo will be created in the following path:

<Z8051 Installation>\Z8051\_<version\_number>\samples\Z51F0811\Demo\demo.hex

- 3. Set up the OCD and Evaluation Board. If you have not already configured these items, please return to the <u>Configure the Z8051 OCD and Z51F0811 Evaluation Board</u> section on page 15.
- Run the Z8051 OCD software. From the Start menu, navigate to All Programs → Zilog Z8051 Software and Documentation <version\_number> → Zilog Z8051 OCD <version\_number>. Once launched, the program will display *Connected*, as shown in Figure 15.

**Note:** If you encounter a message that says Disconnected, return to the <u>Configure the Z8051</u> <u>OCD and Z51F0811 Evaluation Board</u> section on page 15 to configure the proper powerup sequence. If the problem persists, Zilog recommends that you review the <u>Z8051 OCD</u> <u>Driver Installation</u> and <u>FTDI USB-to-UART Driver Installation</u> sections.

>



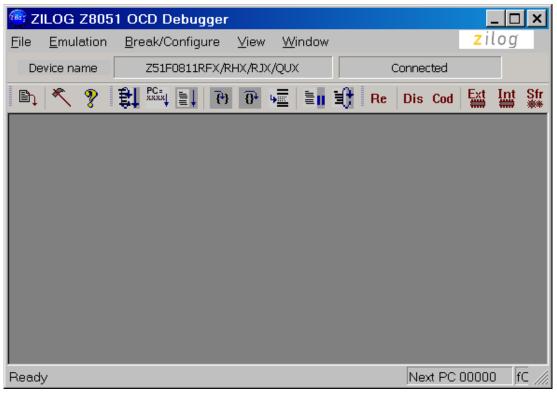


Figure 15. Initial OCD Screen

**Note:** For a free download of the latest version of the OCD software, visit <u>the Zilog website</u> and navigate via the **Tools and Software** menu to **Software Downloads**.

5. In the Debugger window, select **Load Hex** from the **File** menu to display the Object File dialog, which is shown in Figure 16.





Hexa file name		Common area size
🔽 Bank0	Browse	No common area 🛛 🔽 0 ~ 0x7FFF (32KB)
Bank1	Browse	0 ~ 0x3FFF (16KB) 0 ~ 0xBFFF (48KB)
Bank2	Browse	Symbol file
Bank3	Browse	
Bank4	Browse	Do VERIFICATION after download
Bank5	Browse	Job
Bank6	Browse	
Bank7	Browse	
Bank8	Browse	
Bank9	Browse	
Bank10	Browse	
Bank11	Browse	
Bank12	Brawse	
E Bank13	Browse	
Bank14	Browse	
E Bank15	Browse	save message to file Download Close

Figure 16. Object File Dialog

- 6. In the Object file dialog, browse to the hex file that you created in <u>Step 2</u> and click Open.
- 7. Click the **Download** button to open the Configuration dialog box, shown in Figure 17.



Configuration dialog	×
	Boot area
🔲 Lock code area	✓ 2568 : 0100 ~ 01FF
🔽 Lock xdata area	☐ 768B : 0100 ~ D3FF
Disable /RESET input	1.7KB : 0100 ~ 07FF
Enable Xin, Xout	3.8KB : 0100 ~ OFFF
Enable Sub-Xin, Xout	Enable HARD lock
Configuration dur	n <del>p</del>
0000 : 00 E8 14 03 08 0008 : 00 00 00 00 00 0010 : 00 00 00 00 00	00 00 00 00 00 00 00 00 00 00 00 00

Figure 17. Configuration Dialog

8. Click the **Write** button to open the On-Chip Debugger's main window. A typical OCD display is shown in Figure 18; Figure 19 shows an OCD window with child windows open.



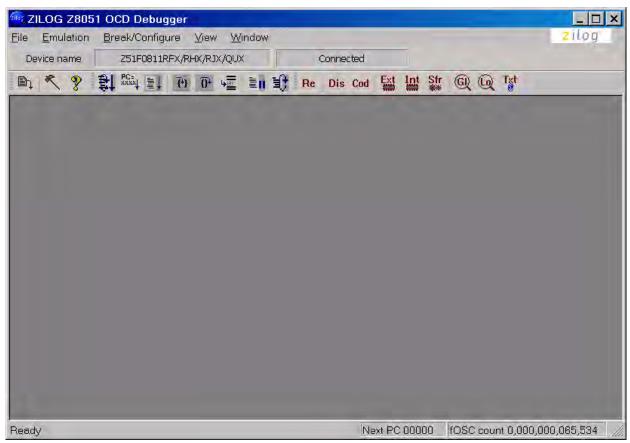


Figure 18. A Typical On-Chip Debugger Window

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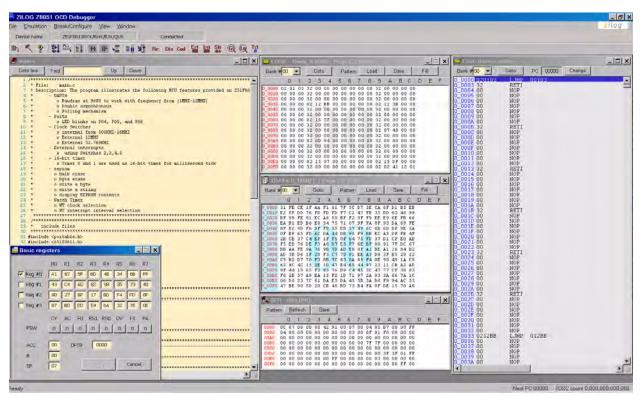


Figure 19. A Typical On-Chip Debugger with Child Windows Open

**Note:** Use the View menu to open the child windows. For this demonstration, the example windows shown in Figure 19 do not need to be opened.

9. Click the **Reset & Go** toolbar icon, shown in Figure 20. As a result, LEDs D1, D2 and D3 on the Z51F0811 Board will blink in sequence.



Figure 20. Reset & Go Toolbar Icon



**Note:** Similar projects that you can use as references are listed in <u>Table 2</u> on page 33.

### Using the Keil µVision IDE on a Demo Project

Zilog's On-Chip Debugger hardware now fully supports the Keil  $\mu$ Vision IDE. Our target driver is seamlessly integrated with the Keil debugger, allowing Keil C51 users to work within the  $\mu$ Vision4 environment without switching between the Keil compiler and Zilog's external OCD software. In the demo project example that follows, the Z51F0811 MCU-related project is referenced as Demo.

**Notes:** This document refers to the Keil µVision IDE V4.53.0.6 (PK51 Prof. Developers Kit) or later.

Refer to the <u>Z8051 Tools Product User Guide (PUG0033)</u> for additional information about these project files and debugging with the Keil  $\mu$  Vision IDE and Zilog On-Chip Debugger.

#### **Debugger Configuration**

Observe the following procedure to build and run a Z51F0811 demonstration project using the Keil  $\mu$ Vision IDE.

- 1. Start the Keil  $\mu$ Vsion4 IDE.
- 2. From the **Project** menu, select **Open Project** and navigate to the following filepath: </br><Installation directory>\Z8051\_<version>\samples\Z51F0811\Demo
- 3. Select the Demo.uvproj file and click **Open**; see Figure 21.



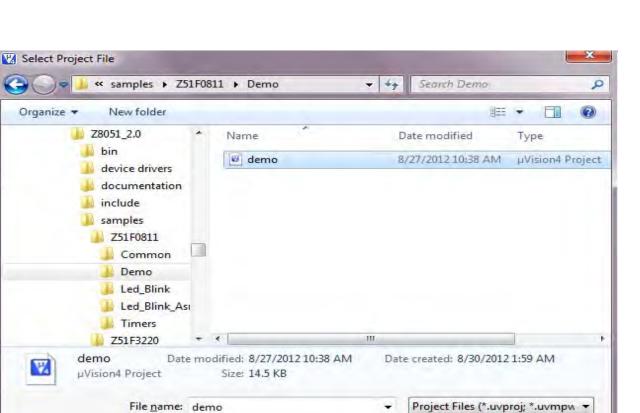


Figure 21. Selecting the Demo Project File

- 4. Return to the **Project** menu and select **Options for Target 'Demo'**.
- 5. In the Options for Target 'Demo' dialog that appears, click the **Device** tab and ensure that your target is properly selected for your project, as illustrated in Figure 22.

Open

Cancel

C

12



Database: Ziog Vendor: Ziog Device: Z51F0811 Toolset: C51 C251F0410 C251F0410 C251F0410 C251F0410 C251F0410 C251F3220 C251F3221	Use Extended Linker (LX51) instead of BL51 Use Extended Accessible 16X811 miles High-Performance 8-Bit CISC Core (2 clocks per cycle) 8 KB On-Chip Rash Memory 256 Bytes SRAM 512 Bytes Data EEPROM
Device: Z51F0811 Foolset: C51 2log 251F0410 251F0410 251F0411 251F3220	High-Performance 8-Bit CISC Core (2 clocks per cycle) 8 KB On-Chip Rash Memory 256 Bytes SRAM 512 Bytes Date EEPROM
Toolset; C51	High-Performance 8-Bit CISC Core (2 clocks per cycle) 8 KB On-Chip Rash Memory 256 Bytes SRAM 512 Bytes Date EEPROM
<ul> <li>Ziog</li> <li>Z51F0410</li> <li>Z51F0211</li> <li>Z51F3220</li> </ul>	High-Performance 8-Bit CISC Core (2 clocks per cycle) 8 KB On-Chip Flash Memory 256 Bytes SRAM 512 Bytes Data EEPROM
251F0410 251F0411 251F0411	8 KB On-Chip Rash Memory 256 Bytes SRAM 512 Bytes Data EEPROM
Z51F6412	Operating Frequency: 1-12 MHz Operating Voltage: 1.8V-5.5V On-Chip 8 MHz RC Oscillator Configurable Basic Interval Timer Timer/Counter (8 bits x 4 channels or 16 bits by 2 channels) plus 16-bit Inter 10-bit PWM with 3 Complementary Pairs with Deadband Insertion Watchdog Timer Watch Timer Universal Synchronous/Asynchronous Receiver/Transmitter (2-channel US Serial Peripheral Interface 12C bus 12-bit ADC with 8 to 15 Input Channels

Figure 22. Selecting the Target

6. After selecting the target, click the **Debug** tab and select the **Zilog Z8051 Target Driver** from the **Use:** drop-down menu, as highlighted in Figure 23.





Oevice   Target ← Use Simulat ← Limit Speed			BL51 Misc Debug Utilities
<ul> <li>Load Applic</li> <li>Initialization File</li> </ul>	and to be a representation of the representa	Load Applic	
	Edit	1	
Restore Debu	g Session Settings	Restore Deb	ug Session Settings
Breakpo	ints 🔽 Toolbox	F Breakpo	oints 🔽 Toolbox
Contraction of the second s	Vindows & Performance Analyzer	[ Watch	
Memory	Display	Memory	Display
CPU DLL:	Parameter:	Driver DLL:	Parameter
S8051.DLL	-mex -m8051EW	S8051 DLL	m8051EW mex
Dialog DLL:	Parameter:	Dialog DLL:	Parameter:
DCore51.DLL	pM8051EW	1	

Figure 23. Selecting the Target Driver

7. Click the Settings button, located to the right of this drop-down menu, to configure your Debug and Flash options. The Settings dialog is displayed with the Debug Options tab appearing by default, as shown in Figure 24.



Settings	<b>-</b>
Debug Options   Flash Options	
Peripheral continous running	
Reset at Main	
OK Cancel	]

Figure 24. Configuring the Debug Options

**Notes:** When configuring the appropriate Debug option, be aware of the following stipulations:

- Checking the **Peripheral continues running** option means that the timers used in your project will run while the processor is stopped by the debugger.
- The **Reset at Main** option will only work if you have a main file in your project; otherwise you should deselect this option.
- Click the Flash Options tab. The Flash Options Settings dialog will appear, as shown in Figure 25. To select the proper options for Flash programming, refer to the Z51F0811 Product Specification (PS0296).



ettings	and the second second	×
Debug Options Flash Options		
Operations	Configuration Options	Boot area
• Mass Erase	Lock code area	✓ 256B : 0100 ~ 01FF
C Page Erase	Lock EEPROM area	☐ 768B : 0100 ~ 03FF
Verify After Programming	Disable /RESET input	1.7KB : 0100 ~ 07FF
Veniy Ater Programming	Enable Xin, Xout	3.8KB : 0100 ~ 0FFF
	Enable Sub-Xin, Xout	Enable HARD lock
	Configu	uration dump
	0008 : 0010 :	
	0018 :	
	OK	Cancel

Figure 25. Configuring the Flash Options

- 9. Click **OK** to exit the Settings dialog.
- 10. From the **Options for Target 'Demo'** dialog, select the **Load Application at Startup** checkbox, as shown in Figure 26, the so that the IDE will download the code upon connection. There is no need to select or enter an initialization file.

Load Application at Startup	Run to main()
	Edit

Figure 26. Load Application at Startup Settings

- 11. Click **OK** to exit the **Options for Target 'Demo'** dialog.
- 12. From the **Project** menu, select **Rebuild All** to rebuild all target files.



13. Start your debugging session by clicking the **Start/Stop Debug Session** icon, as indicated in Figure 27. A default Windows configuration of the debug session is shown in Figure 28.

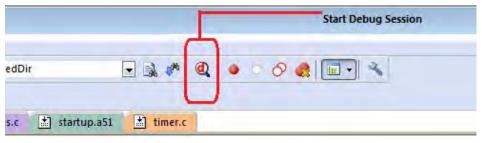
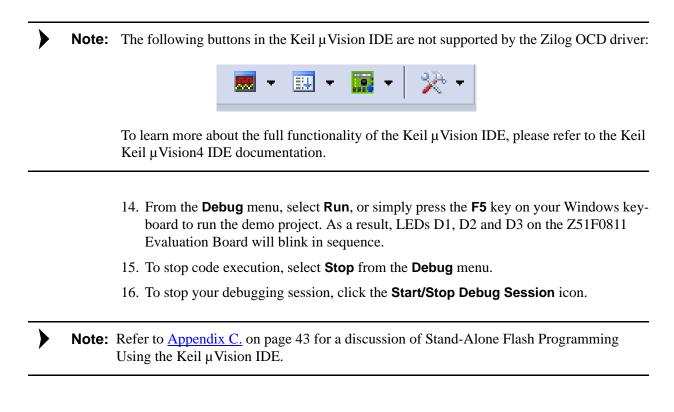


Figure 27. Beginning a Debug Session

File Edit View	Project FI	ash De	bug Peripherals Tools SVCS Window Help	
🗋 💕 🖌 🥥	X In P	10	○ ( ← → ) 整 整 整 課 課 服 版 20 LOW ■ 國 ♥ ( Q ) ● ○ ⑦ 会 ) ■ ▼ ▲	
	·} {}• {}• ·			
Registers		ф 🔛	Disassembly	Ф (
Register	Value	-	103: void init_wt(void) 104: {	
Standard			105: WTMR = 0; //default: disabled, no interrupt, fwck/2^11, clock source = fsub	
······ PC	0x1DA1		C:0x1DB0 E4 CLR A	
SP	0x09		C:0x1DB1 F59D MOV WTMR(0x9D),A	
DPTR	0x0D6F		106: WTR = 0x7F; //default: free run	
ACC	0x00 0xC0	_ 11	C:0x1DB3 759E7F MOV WTR(0x9E),#0x7F	
B	0x6E		107: }	
	0x00		108:	
R0	0x00		109:	
R1	0x6F		110: /***	
R2	0x0D		111: * Function: WT_Isr	
R3	0xFF		112: * Description: Watch Timer service interrupt	
R4	0x00		113: */	
R5	0x00		C:0x1DB6 22 RET	
R6	0x00		( The Yord server wait for completion()	4
R7	0x20			
+ ADC			📩 uarts.c 🖆 main.c 🖄 wt.c 🎽 leds.c 🏦 EEPROM.C	<b>→</b> :
Basic Interval T			97 }	
• Buzzer			98	
Clock			99 🖯 / * * *	
<ul> <li>Flash + EEPRON</li> <li>Employee</li> </ul>	1		100 * Function: init_wt()	
			101 * Description: Initialize Watch Timer Resource	
Interrupts     Port 0			102 4 */	
Port 0     Port 1			103 void init_wt(void)	0
E Port 2			104 🖂 (	
Port 2			➡ 105 WTMR = 0; //default: disabled, no interrupt, fwck/2^11, clock source = fsub	
E Power			106 WTR = 0x7F; //default: free run	
E SPI			107 }	
E Timer 0				
E Timer 1			105 - 110 E/***	
Timer 2			111 + Function: WI Isr	
Timer 3			112 * Description: Watch Timer service interrupt	
Timer 4			113 */	
<u>іі п л</u>		-	114 mid BT Tar/moid) intervent 7 NT VECT	
💷 Project 🛛 🚟 Regi	sters		€ <u> </u>	Þ
Command			📮 🔀 Call Stack + Locals	д
Load "C:\\Pro	gram File	s\\Zi	LOG\\Z8051_1.1\\samples\\Z51F0811\\Demo\\Kei A Name Location/Value Type	
Flash Verify 1			es verified.	
-			UGETCH C:0x1DA1	
4			III char	
>			→ MAIN C:0x125D	
>				

Figure 28. A Default Debug Session





### HyperTerminal Configuration

A communications program such as HyperTerminal can be used on Windows XP systems to view the messages from the Z51F0811 Evaluation Board. The following procedure examines how to configure HyperTerminal for the Z51F0811 demo project.

**Note:** The HyperTerminal application is not available in Windows Vista and Windows 7 systems. If you are using either of these operating systems, consider using/installing different communication software, such as Tera Term. Please refer to the documentation for the particular emulation software you use to configure it for communication with the Z51F0811 Evaluation Board.

1. In HyperTerminal, select the COM port assigned to the USB-to-UART interface cable that is connected to the P1 connector on the Evaluation Board.



# **Note:** This COM port can be determined from the Device Manager, as described in the the <u>FTDI</u><u>USB-to-UART Driver Installation</u> section on page 13.

- 2. Configure this port to reflect the following settings:
  - 9600bps
  - 8 data bits
  - No parity
  - 1 stop bit
  - No flow control
- 3. Click the **Call** button to connect to the Z51F0811 Board. Upon connection, you should be able to see the Demo program menu shown in Figure 29.

🏀 Monitor 9600 Com10 - HyperTe	rminal					
<u>File Edit ⊻iew Call Transfer H</u>	elp					
				_		- <b>-</b>
+					+	
* Z51F0811	L Demo Pro	ogram				
* * o Default delay of LED	)e mata ie	500mc at	QMU7			
* o Use switch 2 or hit	1 to chang	je direct	ion			
1) Chapma LEDa dimenti		بمطينيما				
1) Change LEDs direction 2) Clock Switching Tes	on t					
3) EEPROM Test						
4) Watch Timer Test Selection >> _		15.1				
		1				
Connected 0:00:38 ANSIW	9600 8-N-1	SCROLL	CAPS	TULIN	Cepture	FI /

Figure 29. Demo Program Menu in HyperTerminal

At this point, you have successfully run the Z51F0811 demo project, but you are welcome to continue evaluating the demo in HyperTerminal. For additional information about how to create, edit, run and debug this project, please see the Z8051 Tools Product User Guide



(PUG0033) and/or the Z8051 On-Chip Debugger and In-System Programmer User Manual (UM0240).

**Note:** Turn off the power by removing the USB cable from the P1 connector on the Evaluation Board.



## **Sample Projects and Documentation**

A number of sample projects are included on the CD that ships with the Z51F0811 Evaluation Kit, and their locations, listed in Table 2, will be accessible upon installation.

Description	Location
Demo	samples\Z51F0811\Demo
Led Blink	samples\Z51F0811\Led_Blink
	samples\Z51F0811\Led_Blink_Asm
Timer 0	samples\Z51F0811\Timers\Timer0
Timer 1	samples\Z51F0811\Timers\Timer1
Timer 2	samples\Z51F0811\Timers\Timer2
Timer 3	samples\Z51F0811\Timers\Timer3
Timer 4	samples\Z51F0811\Timers\Timer4
Timer 01	samples\Z51F0811\Timers\Timer_01_16bit
Timer 23	samples\Z51F0811\Timers\Timer_23_16bit

Table 2. Z51F0811 Evaluation Kit Sample Projects

A number of Z8051-related documents are included in the Z51F0811 Evaluation Kit, and their locations, listed in Table 3, will be accessible upon installation. You can also find current versions of each of these documents on the <u>Zilog website</u>.

Table 3. Z51F0811 Evaluati	on Kit Documentation
----------------------------	----------------------

Description	Document	Location
Z51F0410 Product Specification	PS0295	Documentation\Chip_Documentation
Z51F0811 Product Specification	PS0296	Documentation\Chip_Documentation
Z51F3220 Product Specification	PS0299	Documentation\Chip_Documentation
Z51F3221 Product Specification	PS0300	Documentation\Chip_Documentation
Z51F6412 Product Specification	PS0303	Documentation\Chip_Documentation
Z51F0410 Product Brief	PB0237	Documentation\Chip_Documentation
Z51F0811 Product Brief	PB0238	Documentation\Chip_Documentation
Z51F3220 Product Brief	PB0239	Documentation\Chip_Documentation
Z51F3221 Product Brief	PB0240	Documentation\Chip_Documentation



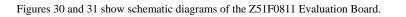
#### Table 3. Z51F0811 Evaluation Kit Documentation (Continued)

Description	Document	Location
Z51F6412 Product Brief	PB0241	Documentation\Chip_Documentation
Z8051 OCD and ISP User Manual	UM0240	Documentation\Tools_Documentation
Z51F0811 Evaluation Kit User Manual	UM0242	Documentation\Tools_Documentation
Z51F3220 Development Kit User Manual	UM0243	Documentation\Tools_Documentation
Z8051 Tools Product User Guide	PUG0033	Documentation\Tools_Documentation

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### **Schematic Diagrams**



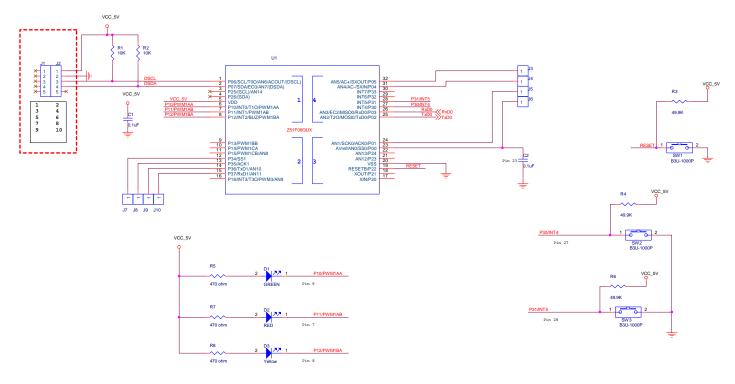
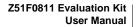


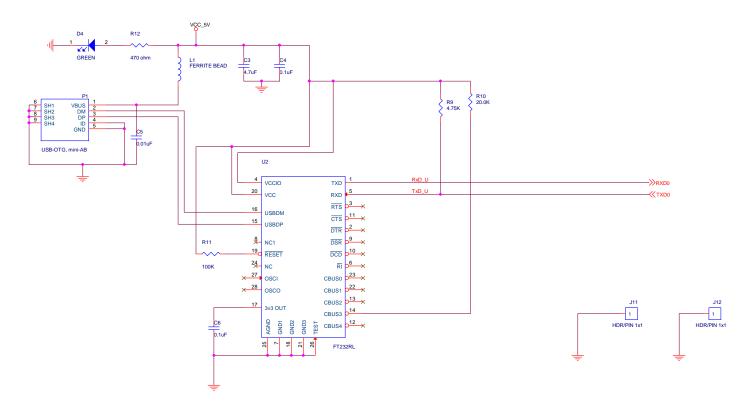
Figure 30. Z51F0811 Evaluation Board, #1 of 2

UM024205-1012

Schematic Diagrams



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UM024205-1012

Schematic Diagrams

Downloaded from Elcodis.com electronic components distributor



# Appendix A. OCD Driver Installation on Windows Vista Systems

The driver programs for the Z8051 On-Chip Debugger are copied to the development PC during the software and documentation installation. In the following procedure for PCs running Windows Vista 32- and 64-bit operating systems, ensure that the target side of the OCD will remain unconnected while you install these drivers.

- 1. Connect the OCD hardware to the USB port of your PC by connecting the A (male) end of one of the two USB A (male)-to-Mini-B cables with the development PC's USB port. Connect the Mini-B end to the OCD device.
- 2. After the PC detects the new hardware, it will display the Found New Hardware Wizard dialog box, shown in Figure 32. Click Locate and install driver software (recommended).



Figure 32. Found New Hardware Dialog, Windows Vista

3. Depending on your development PC's User Account Control settings, Windows may ask for permission to continue the installation. Click **Continue**.



4. When the **Insert the Disc** dialog appears, as shown in Figure 33, select **I don't have the disc. Show me other options.** Click the **Next** button to display the dialog that follows, which is shown in Figure 34.

isert the	disc that came with your ZILOG OC	CD I/F
	e disc that came with your device, insert it no c for driver software.	ow. Windows will automatically
	T	

Figure 33. Install Device Driver Dialog, Windows Vista

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Win	dows couldn't find driver software for your device	
•	<u>Check for a solution</u> Windows will check to see if there are steps you can take to get your device working.	
+	Browse my computer for driver software (advanced) Locate and install driver software manually.	

Figure 34. Couldn't Find Driver Dialog, Windows Vista

5. Return to page 6 and follow <u>Steps 3 through 6</u>.



# Appendix B. OCD Driver Installation on Windows XP Systems

The driver programs for the Z8051 On-Chip Debugger are copied during the software and documentation installation. On Windows XP systems, ensure that the target side of the OCD will remain unconnected while you install these drivers. *It is important that you observe the following procedure; do not skip ahead until the OCD drivers are installed.* 

- 1. Connect the OCD hardware to the USB port of your PC by connecting the A-Male end of one of the two USB A (male)-to-Mini-B cables with the host PC's USB port, and connect the Mini-B end to the OCD device.
- 2. After the PC detects the new hardware, it will display the Found New Hardware Wizard dialog box, shown in Figure 35. Select Install from a list or specific location (Advanced); then click Next.



Figure 35. The Found New Hardware Wizard Welcome Screen

- 3. The next dialog box, shown in Figure 36, prompts you to enter a path or navigate to the directory in which the .inf file was installed. Depending on the type of computer you use (32- bit or 64-bit), use the **Browse** button to navigate to one of the following paths and click the **Next** button, leaving all other selections at their default settings.
  - On 32-bit machines, use the following path:

<Z8051 Installation>\Z8051\_<version\_number>\device drivers\OCD USB\x32

– On 64-bit machines, use the following path:

<Z8051 Installation>\Z8051\_<version\_number>\device drivers\OCD USB\x64

**Note:** On some installations, the Found New Hardware screen shown in Figure 35 may also display the text string, Zilog Z8051 USB OCD - No Firmware. This occurrence is normal and can be disregarded.

lease	choose your search and installation options.
TENHILE.	
()	Search for the best driver in these locations.
	Use the check boxes below to limit or expand the default search, which includes local paths and removable media. The best driver found will be installed.
	Search removable media (floppy, CD-ROM)
	Include this location in the search:
	C:\Program Files\Zilog\Z8051_1.0\device drivers\OCD UE
C	Don't search. I will choose the driver to install.
	Choose this option to select the device driver from a list. Windows does not guarantee that the driver you choose will be the best match for your hardware.

Figure 36. The Found New Hardware Wizard's Browse Screen



4. When Windows prompts you whether to continue the installation or stop, click the **Continue Anyway** button and wait until the installation is completed (Windows may prompt you more than once). When the installation is complete, click **Finish**.

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# Appendix C. Stand-Alone Flash Programming Using the Keil µVision IDE

Observe the following procedure to program Flash memory without debugging.

1. From the **Project** menu, open the **Options for Target 'your project'**, and click the **Utilities** tab. In the **Use Target Driver for Flash Programming** drop-down menu within the Configure Flash Menu Command pane, ensure that **Zilog Z8051 Target Driver** is selected, as indicated in Figure 37.

and rough	t Driver for Flash Programming			
	Zilog Z8051 Target Driver	✓ Settings	Update Target	before Debugging
Init File:			Edit.	
Command				
Arguments				

#### Figure 37. Selecting A Target Driver For Flash Programming

2. Click the **Settings** button to change any additional Flash options. The Settings dialog will appear, as shown in Figure 38.



Debug Options Flash Options			
Operations	Configuration Options	Boot area	
• Mass Erase	Lock code area	✓ 256B : 0100 ~ 01FF	
C Page Erase	Lock EEPROM area	☐ 768B : 0100 ~ 03FF	
Verify After Programming	Disable /RESET input	□ 1.7KB : 0100 ~ 07FF □ 3.8KB : 0100 ~ 0FFF	
iv veniy /vter riogramming	Enable Xin, Xout		
	Enable Sub-Xin, Xout	Enable HARD lock	
	Configu	uration dump	
	0000.00 20	14 03 08 00 00 00 00 00 00 00 00 00 00 00 00 00	

Figure 38. Configuring Additional Flash Options

- 3. After you have selected your Flash options, click **OK** to exit the **Flash Options** dialog.
- 4. Click **OK** to exit the **Options For Target 'Demo'** dialog.
- 5. From the **Flash** menu of the Keil IDE (see Figure 39), select either of the following options:
  - Select **Download** to program Flash memory with the current project
  - Select **Erase** to perform a mass erase of internal Flash memory

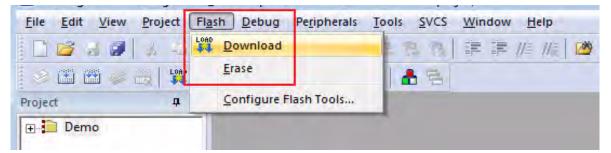


Figure 39. The Keil IDE Flash Menu

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