

ZGP323ICE02ZEMG

Z8 GP™ ZGP323 In-Circuit Emulator

User Manual

UM019606-0408

Revision History

Each instance in the Revision History table reflects a change to this document from its previous revision. For more details, refer to the corresponding pages and appropriate links in the following table.

	Revision		Page
Date	Level	Description	Number
April 2008	06	Replaced Figure 5 and Figure 11.	8 and 16
February 2008	05	Updated Connecting ZGP323 ICE to the Target Pod and Z8 GP Package Support and Ordering Information.	5 and 34
December 2007	04	Updated System Requirements, Debugger instructions, trace/ event procedure, and Figure 12	2, 23, 20, and 24.
September 2007	03	Updated System Requirements, Figure 12, and Burn Code from the Current Project.	2, 20, and 25
July 2007	02	Updated document with latest company address and implemented Zilog Style Guide.	All
November 2005	01	Original Issue	All

UM019606-0408 Revision History

Table of Contents

Introduction	1
Kit Features	1
System Requirements	2
Software Installation	
Hardware Installation	3
Connecting Target Pod	3
Connecting ZGP323 ICE to the Target Pod	
Connecting ZGP323 ICE to OTP Programming	
Module (Optional)	. 5
Connecting ZGP323 ICE to a PC	. 6
Ethernet Port Connection	6
USB Port Connection	. 15
Sample Project	18
Collecting a Trace	
Using an Event to Stop Execution	
Collecting Trace After an Event	
OTP Programming	
Burn Code from the Current Project	
Burn Code from an Existing Hex File	
LED Indicators	
External Interface Connectors	
Using J5 Pin 3, External Trigger Out	
Using J5 Pin 1, External Trigger In	
Z8 GP Package Support and Ordering Information	
Appendix A-ZGP323 ICE	
Commands	. 35
Customer Support	. 5/

UM019606-0408 Table of Contents

Introduction

Zilog's Z8 GP™ ZGP323 In-Circuit Emulator (ICE) provides Z8 GP chip family emulation with a Trace and Event system for program debugging using Zilog Developer Studio II (ZDS II) development tools. Once your code is complete, use the included OTP programming module to burn your design on to OTP devices.

Kit Features

The kit includes the following features:

- Emulation and OTP Programming support for the Z8 GP Family
- Emulation Pod for 20- and 28- Pin PDIP Packages
- Z8 GP ZGP323 Evaluation Board
- Trace and Event System
- Ethernet and USB Interface
- Up to 8 MHz Clock Frequency
- 2.0–3.6 V V_{DD}
- ZDS II
- Assembler and Full ANSI C Compiler
- Documentation
- Sample OTP Devices

System Requirements

Table 1 lists the system requirements for running ZDS II.

Table 1. ZDS II System Requirements

Recommended Configuration	Minimum Configuration
PC running MS Windows XP Pro	PC running MS Windows 98 SE/ Windows2000-SP4/Windows XP Pro
Pentium III/500 MHz processor	Pentium II/233 MHz processor
128 MB RAM	96 MB RAM
65 MB hard disk space	25 MB hard disk space (documentation not included)
Super VGA video adapter	Super VGA video adapter
CD-ROM drive	CD-ROM drive
Ethernet port	Ethernet or USB port
USB high-speed or full-speed port	
One or more RS-232 communications ports ¹	
Internet browser (Internet Explorer or Netscape)	Internet browser (Internet Explorer or Netscape)
Note: ¹ RS232 communication port is not necessary when using U	ISB or default Ethernet IP

Software Installation

Follow the steps below to install ZDS II with ANSI C-Compiler:

1. DemoShield program available in the ZDS II installation CD launches automatically. Otherwise, go to the root of the CD-ROM and double-click the file launch.exe.

- DemoShield provides several installation options to install ZDS II, select Install ZDS II. You can install other software and accompanying documentation later.
- 3. Follow the instructions on the screen to complete the installation.

Hardware Installation

The ZGP323 ICE features an Ethernet interface, a USB interface, and an RS-232 serial port. Hardware installation consists of the following:

- Connecting Target Pod
- Connecting ZGP323 ICE to the Target Pod
- Connecting ZGP323 ICE to OTP Programming Module (Optional)
- Connecting ZGP323 ICE to a PC

You have to reconfigure network settings on the PC or on the ZGP323 ICE before using the emulator.

Connecting Target Pod

Use an appropriate target pod and pin converter to connect the ZGP323 ICE to the target board. Figure 1 on page 4 illustrates the ZGP323 ICE top panel connectors and Figure 2 on page 4 illustrates the ZGP323 evaluation board included with the kit. The 20- and 28-PDIP target pods plug into the associated PDIP sockets on the target board. For example, if your target board has a 20-SOIC socket, mate the 20-PDIP target Pod onto the 20-PDIP to 20-SOIC converter. Then install the target pod and converter assembly into the board's 20-SOIC socket

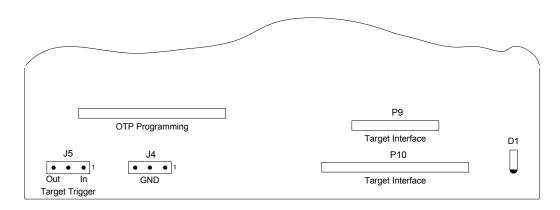


Figure 1. ZGP323 ICE Top View

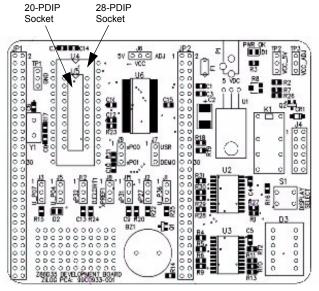


Figure 2. ZGP323 Evaluation Board

Connecting ZGP323 ICE to the Target Pod

After installing the appropriate target pod (and converter, if required) onto the target development board, connect the ZGP323 ICE to the target pod as follows:

- For 40-PDIP and 48-SSOP target pods:
 - Connect the 20-circuit cable from P9 on the emulator to P2 on the 40-PDIP target pod. (The 20-circuit cable is included in the 40/48-pin accessory kit, ZLP323ICE01ZAC, ordered separately).

Note: *ZLP323ICE01ZAC* has been replaced by an improved version, *ZCRMZNICE02ZACG*.

- Connect the 34-circuit cable from P10 on the emulator to P1 on the 40-PDIP target pod.
- For 20-PDIP and 28-PDIP target pods:
 - Connect the 34-circuit cable from P10 on the emulator to P16 on the target pod. (Emulator connector P9 is not used).

Connecting ZGP323 ICE to OTP Programming Module (Optional)

After developing and debugging your software, follow the steps below to connect the ZGP323 ICE to the OTP programming module so that you can burn your code onto the OTP chip:

- 1. Connect the 40-circuit ribbon cable from the ZGP323 ICE OTP Programming connector to connector P1 on the OTP programming module.
- 2. The 40-PDIP ZIF socket on the OTP programming module is designed to accept 40-PDIP OTP chips. The OTP programming adapters supplied with the ZGP323 ICE allow you to adapt the ZIF



socket to accept 20/28-PDIP chip packages. Other adapters are available separately, see Z8 GP Package Support and Ordering Information on page 34 for more information.

After installing the OTP chip into the ZIF socket (or programming adapter), you can program the chip using the instructions provided in OTP Programming on page 25.

Connecting ZGP323 ICE to a PC

You can connect the ZGP323 ICE to a host PC using either an Ethernet or USB port. To connect the ZGP323 ICE to a host PC using Ethernet, see Ethernet Port Connection. To connect the ZGP323 ICE to a host PC using USB port, see USB Port Connection on page 15.

Ethernet Port Connection

Follow the steps below to connect the ZGP323 ICE to a host PC using Ethernet:

- 1. Connect a CAT-5 crossover cable from the PC to the Ethernet port on the ZGP323 ICE, see Figure 3.
- **Note:** You can connect the ICE to an Ethernet hub using a CAT-5 patch cable.
 - 2. Connect the serial COM port on the PC to the SETUP serial port on the ZGP323 ICE using the DB9-to-DB9 serial cable, see Figure 5 on page 8.

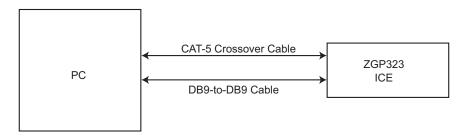


Figure 3. Connecting a PC to the ZGP323 ICE



Figure 4. ZGP323 ICE Rear Panel



Caution: *Ensure the target board is not powered ON.*

3. Connect a 5 V DC power supply to the ZGP323 ICE. The 3.3 V DC and 1.8 V DC power LEDs must illuminate, see Figure 5. Contact Zilog® support at www.zilog.com if there is any problem.





Figure 5. ZGP323 ICE Front Panel

Setting Up Ethernet Communications

The default IP address and subnet mask of the ZGP323 ICE are 192.168.1.50 and 255.255.255.0, respectively. To enable communication between the PC running ZDS II and the ZGP323 ICE, you must either change the PC's Ethernet settings to match those of the ZGP323 ICE or vice versa.

If using the PC in a stand-alone configuration, set the PC's IP address to 192.168.1.21 and its subnet mask to 255.255.255.0. For more details, see Changing the PC's Settings to Match the ZGP323 ICE.

In a networked environment, set the ZGP323 ICE IP address and subnet mask to match the network setup. For more details, see Changing ZGP323 ICE Settings on page 13.

q

Changing the PC's Settings to Match the ZGP323 ICE

Follow the steps below to change the PC's Ethernet settings:

Note: The following instructions are for MS Windows XP. If your Windows OS is different, refer to your MS Windows OS online help for details.

1. Open the **Windows Control** Panel and double-click the **Network Connections** icon, see Figure 6 on page 9.

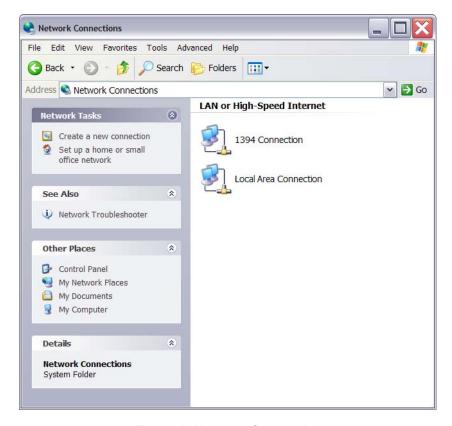


Figure 6. Network Connections

2. In the panel labeled LAN or High-Speed Internet, double-click the Local Area Connection icon. The Local Area Connection Status window appears, see Figure 7.

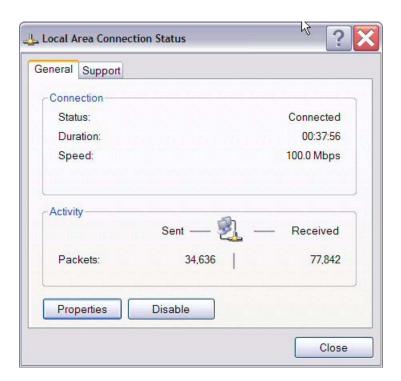


Figure 7. Local Area Connection Status Window

3. In the **Local Area Connection Status** window, click **Properties** button. The **Local Area Connection Properties** dialog box appears, see Figure 8.

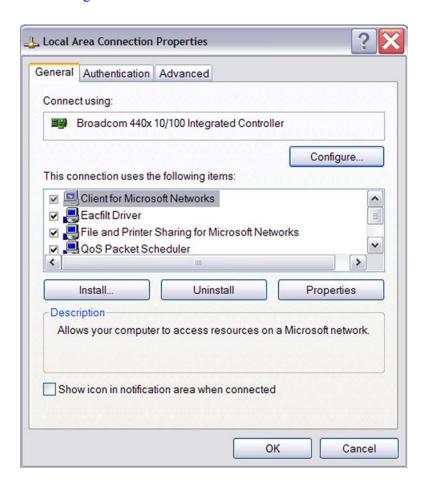


Figure 8. Local Area Connection Properties Dialog Box

4. Select Internet Protocol (TCP/IP) from the scroll down list, and click Properties button. The Internet Protocol (TCP/IP) Properties dialog box appears, see Figure 9.

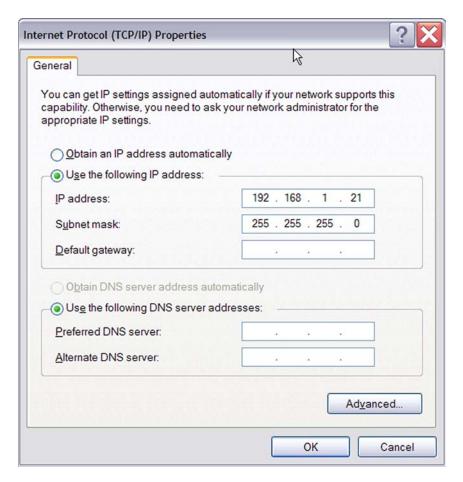


Figure 9. Internet Protocol Properties Dialog

- 5. Enter the IP address and subnet mask to match those shown in Figure 9 on page 12. Leave the remaining fields blank. In this example, an IP address of 192.168.1.21 and a subnet mask of 255.255.255.0 are being assigned to the PC. These values connect the PC to the same network as the ZGP323 ICE unit.
- 6. Click **OK** and restart the PC.

Note: To execute a sample project, see Sample Project on page 18.

Changing ZGP323 ICE Settings

Follow the steps below to change the ZGP323 ICE Settings:

- 1. Connect the serial port of the PC to the ZGP323 ICE serial port using the DB9-to-DB9 serial cable.
- 2. Launch HyperTerminal on the PC by selecting **Start** —> **Programs** --> Accessories --> Communications --> HyperTerminal. The **Connection Description** dialog box appears.
- 3. Enter the name for a new connection in the **Connection Description** dialog box, and click **OK** to open the **Connect To** dialog box.
- 4. In the Connect To dialog, set the Connect Using drop-down menu to match the COM port to which the ZGP323 ICE is connected. Click OK.
- 5. A **COM Properties** dialog appears. Enter the following port settings and click **OK**. HyperTerminal should automatically attempt a connection. Otherwise, select Call —> Connect.

Bits per second	57600
Data bits	8
Parity	None
Stop bits	2
Flow control	None

14

6. When the emulator is turned on or reset, a ZGP323 ICE console boot-up message appears in the HyperTerminal. A typical boot-up message is shown below:

```
ZiLOG Z8 LXM ICE
Firmware Version 2.0, Build (Aug 22 2005 08:14:37)
Copyright (C) 2005 ZiLOG, Inc. All Rights Reserved.
Adding emac driver...
Attempting to establish Ethernet connection.
10 Mbps Half-Duplex Link established
IP Address: 10.1.7.95
IP Subnet: 10.1.0.0/255.255.0.0
IP Gateway: 10.1.1.254
```

Press 'Ctrl-Z' to enter configuration mode

7. Press Ctrl-z. The emulator command prompt appears: Z8 LXM ICE %

Note: *The emulator console prompt is not case-sensitive.*

Type help or ? at the emulator command prompt to see a list of available commands. For information on the description of the complete ZGP323 ICE commands, see Appendix A–ZGP323 ICE Commands on page 35.

- 8. When you have finished configuring the emulator, type exit to exit the command shell.
- 9. Press **Alt+F4** to exit HyperTerminal.
- 10. Type reboot and press **Return** or cycle the power on the ZGP323 ICE for the new settings to take effect.
- 11. The hardware is now configured and ready for application development.

Note: To execute a sample project, see Sample Project on page 18.

USB Port Connection

To connect the ZGP323 ICE to your PC using a USB port, load the appropriate driver from the ZDS II installation directory or CD-ROM provided with your emulator. ZDS II software is available for download from www.zilog.com. The procedure of loading the appropriate driver, depends on your Windows OS version and is explained below:

Windows XP

Follow the steps below to connect the ZGP323 ICE to a host PC using USB Connection for Windows XP OS version:

1. Connect the ZGP323 ICE to the host PC using the supplied USB cable, see Figure 10 for ZGP323 ICE rear panel connection.



Figure 10. ZGP323 ICE Rear Panel



Caution: *Ensure the target board is not powered ON.*

Connect a 5 V DC power supply to the ZGP323 ICE. The 3.3 V DC and 1.8 V DC power LEDs should illuminate, see Figure 5 on page 8. Contact Zilog[®] support at www.zilog.com if there is any problem. In Windows, the Found New Hardware wizard should activate automatically.



Figure 11. ZGP323 ICE Front Panel

- 3. In the wizard, select **Install from a list or specific location** (Advanced); click Next.
- **Note:** If the Windows Logo testing dialog appears, select **Continue Any**way.
 - 4. Select **Search for the best driver in these locations** and include those locations in the search.
 - 5. Browse to one of the following driver directories: <ZDS II Installation Directory>\device drivers\USB <ZDS II Installation CD>\Device Drivers\USB
 - 6 Click Next
 - 7. Select the appropriate driver, and click **Next**.

8. Click **Finish** to complete the installation.

Windows 2000/Windows 98SE

Follow the steps below to connect the ZGP323 ICE to a host PC using USB Connection for Windows 2000/Windows 98SE OS version:

 Connect the ZGP323 ICE to the host PC using the supplied USB cable, see Figure 10 on page 15 for ZGP323 ICE rear panel connection



Caution: *Ensure the target board is not powered ON.*

- Connect a 5 V DC power supply to the ZGP323 ICE. The 3.3 V DC and 1.8 V DC power LEDs should illuminate, see Figure 5 on page 8. Contact Zilog[®] support at www.zilog.com if there is any problem. In Windows, the Found New Hardware wizard must activate automatically.
- 3. In the wizard, click **Next**.
- 4. Select Search for a suitable driver for my device (Recommended); click Next.
- 5. Select Specify a location, click Next.
- 6. Browse to one of the following driver directories: <ZDS II Installation Directory>\device drivers\USB <ZDS II Installation CD>\Device Drivers\USB
- 7. Click Next.
- 8. Select the appropriate driver, and click **Next**.
- 9. Click **Finish** to complete the installation.

Sample Project

After installing the ZDS II software and setting up the hardware, you are ready to execute the sample software project to verify proper emulator operation and to test with the Trace and Event system. This section describes how to run the emulator in the in-circuit mode.

- - **Notes:** 1. If you run the emulator with a target attached, the emulator's voltage comparator is designed to serve as a target power sensor, and not as a precision voltage measurement device. If you set the Target VCC to match your target and the target's voltage drifts downward, the power sensor may no longer detect it. The emulator may therefore not connect to the target. In such cases, set the Target VCC voltage progressively lower until a proper connection is established.
 - 2. If the ZGP323 evaluation board supplied with the kit is used, refer to Z8 GPTM ZGP323 Evaluation Board User Manual (UM0180), for technical details and board jumper settings.

The sample project ledblink c.zdsproj is included in the ZDS II sample directory, located in:

c:\Program Files\ZiLOG\ZDSII CrimzonGP Emulator <ver-</pre> sion>\samples\ZGP323 ledBlink\ledblink c\src

Note: An assembler version of the sample program is located in the ledblink asm\src subdirectory.

> Start ZDS II for the ZGP323 ICE Emulator by selecting **Start** -> ZiLOG ZDS II -Crimzon+GP Emulator Kit <software version> and follow the instructions below to run ledblink_c.zdsproj, the sample project.

1. Ensure that ZGP323 ICE and the target board are powered ON.

2. Use File —> Open Project menu option to open the sample project file located at the following path:

c:\Program Files\ZiLOG\ZDSII CrimzonGP Emulator <version>\samples\ZGP323 ledBlink\ledblink c\src

- 3. To open the source file, double-click on irmain.s file in the Project Files Window.
- 4. Select Project —> Settings.
- 5. In the General tab, set the CPU Family field to ZGP323 and the **CPU field type** to ZGP323XXX2832.
- 6. Follow either of the below options to connect the emmulator and the PC:
 - If you are using Ethernet communications between the emulator and the PC:
 - In the **Debugger** tab, see Figure 12 on page 20, select EthernetEmulator from the debug tool area and click Setup button
 - The **Ethernet Configure Driver** dialog box appears. The IP Address field displays a default IP address, 192.168.1.50. Enter the ZGP323 ICE IP address if it has been modified. Leave the Port setting at 4040.
 - Click OK.
 - If you are using USB communications between the emulator and the PC:
 - In the **Debugger** tab, see Figure 12 on page 20, **USBEmulator** from the debug tool area and click **Setup** button.
 - The **USB Configure Driver** dialog box appears. The Serial Number field displays a serial number for the USB interface. Click **OK**

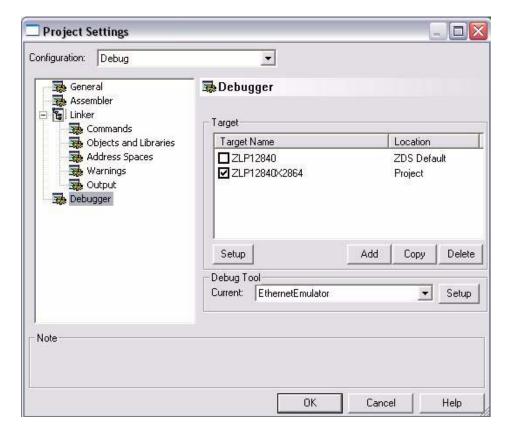


Figure 12. Project Settings, Debugger Tab

- 7. In the **Debugger** tab, click **Setup** button, **Configure Target** window appears.
- 8. Set the **Voltage** drop-down menu to **Standalone** if the emulator is not connected to a target. If the emulator is connected to a target, set the **Voltage** drop-down menu to the voltage appropriate for the connected target.

- 9. In **Clock Source** section, select **Internal** radio button if the emulator is not connected to a target, and set the **Clock Frequency** to 7.5 MHz. If the emulator is connected to a target, select **External** radio button.
- 10. In the **Programming Option Bits** section, ensure that none of the options are selected.
- 11. Click OK.
- 12. Click **OK** in the **Project Settings** window and when prompted to rebuild the affected files, click **Yes** to rebuild the project. (You can also rebuild later by pressing F7.)
- 13. Click **Go** button to connect to the target and start debugging.
- 14. Click **Break** button and **Stop Debugging**, to exit the debug session.
- **Note:** The following steps describe two ways to use the Trace and Event system. For details on executing the Trace and Event system, refer to ZDS II online help and ZDS II—Z8 GPTM Family User Manual (UM0178), located in the docs directory of the ZDS II CD-ROM.

Collecting a Trace

Follow the steps below to obtain a sample trace:

- 1. Collect a simple trace by starting the program, stopping it, and viewing the trace buffer. Click **Go** button in the toolbar, wait a moment, and then click **Break** button. The Trace buffer acts as a ring buffer that continuously fills and then overwrites itself until you stop execution.
- 2. Select the **Trace** window by selecting **View** —> **Debug Windows** —> **Trace** and click **Get Frames** to display the trace information.
- 3. To view the disassembled trace, click **Options** button in the **Trace** window and select Show Disassembled Trace.

Using an Event to Stop Execution

Events allow you to stop execution based on more complex conditions than a simple instruction address.

The following events are available:

- Program counter position, with mask
- Data on Port0 (state of its pins), with mask
- Data on Port2 (state of its pins), with mask
- Data on Port3 (state of its three input pins), with mask
- External Trigger In (0 or 1)

The following steps setup and execute an event:

- 1. Select Tools —> Trace and Event System. The Trace and Event **System** window appears, see Figure 13 on page 23.
- 2. Check Enable Event System check box and in the Then: section, check **Break** radio button
- 3. In the When: section, check Program Counter check box and set Program Counter to 0044 and Mask to FFFF.

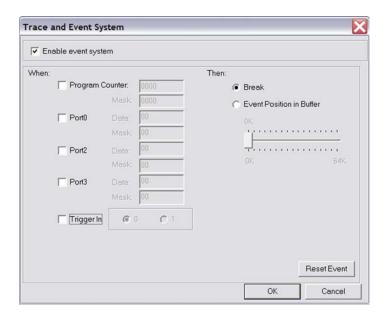


Figure 13. Trace and Event System Window

- 4. Click **OK**.
- 5. Open the Trace window by selecting **View** —> **Debug Windows** —> **Trace**.
- 6. In the **Trace** window, click **Clear Trace** button.
- 7. To reset the **Debugger** click the **Reset** button in the toolbar, or select **Debug** —> **Reset**.
- 8. Click the **Go** button or select **Debug** —> **Go** to run the **Debugger**. When the program counter reaches 0044, execution stops on event match.
- 9. Click **Get Frames** to display the trace information.

Collecting Trace After an Event

The Trace and Event System is also used to capture trace data after an event. Set up the events as described in Using an Event to Stop Execution on page 22. In the **Then:** section, check **Event Position in Buffer** radio button instead of **Break**. Use the slider bar to select the number of cycles from the 64K buffer to be captured after the event.

When the event is detected, the selected number of cycles after the event are collected. Execution stops after the cycles are collected. After the event, selected number of cycles are left in the trace buffer.

Single-Stepping Through a Program

ZDS II provides a simple mechanism for single-stepping through a program. Follow the steps below to single-step through a program:

- Reset the program to main() by either clicking Reset icon or by selecting Debug —> Reset. Set the Reset to main() option by selecting Tools —> Options. In the Options window, select the Debugger tab and select the Reset to symbol 'main' check box.
- 2. To step through the program one instruction at a time, use F11 or click **Go** button in the **Debug** toolbar or select **Debug** -> **Step Into**.

Peek/Poke Registers

Follow the steps below to read the emulator register contents:

- ZDS II makes it easy to set and read emulator register contents. With the ledblink_c.zdsproj project open and ZDS II connected to the emulator (target), select View —> Debug Windows —> Registers.
- 2. In the **Registers** window, double-click the value of any register and type in a new value.
- 3. Press **Enter**. The new value is displayed in red.

For more information on setting and reading register values, refer to ZDS II User Manual (UM0164) on the ZDS II CD-ROM and the ZDS II online help.

Peek/Poke Memory

Follow the steps below to set and read the peek/poke memory contents:

- 1. With the ledblink c.zdsproj project open and ZDS II connected to the emulator (target), select View -> Debug Windows -> Memory.
- 2. In **Memory** window, double-click the value to be changed and type in a new value. (Values begin in the second column after the Address column.)
- 3. Press **Enter**. The new value is displayed in red.

For more information on setting, filling, and reading memory, refer to ZDS II User Manual (UM0164) on the ZDS II CD-ROM and the ZDS II online help.

OTP Programming

Use the ZGP323 ICE OTP Programming Module to burn your program onto a Z8 GP family chip. There are two ways to burn an OTP chip:

- 1. Burn Code from the Current Project
- 2. Burn Code from an Existing Hex File

Note: Do not connect to the emulator when programming windowed CDIP parts, see Burn Code from an Existing Hex File on page 29 when CDIP programming windowed CDIP parts.

Burn Code from the Current Project

Note: If you are currently in debugging mode, click **Debug** -> **Stop Debug**ging or press Shift-F5 to stop debugging.

26

Follow the steps below to burn code from the current project built in ZDS II (loaded in emulator RAM):

- 1. Connect the OTP programming module to the emulator as described in Connecting ZGP323 ICE to OTP Programming Module (Optional) on page 5.
- 2. Select the OTP chip to be burned and the appropriate package converter.
- 3. Install the package converter, if used, into the ZIF socket on the OTP programming module.
- 4. Install the OTP chip to be burned into the ZIF socket on the OTP programming adapter. Match pin 1 of the chip with pin 1 of the ZIF socket.
- 5. In ZDS II, open the project for the code to be burned onto the chip. In the **Project—>Settings —>Debugger Page—>Target—>Setup**
 - Choose the appropriate voltage level according to your device product specification from the **voltage dropdown** menu
 - Choose between external or internal clock source from the clock source
 - Choose appropriate frequency level from the **clock frequency**
 - Configure the programming option bits from Tools—>OTP Programming
- 6. In ZDS II, click Connect to Target button to connect to the emulator.
- 7. Select **Tools** —> **OTP Programming** to open the **OTP** window, see Figure 14.

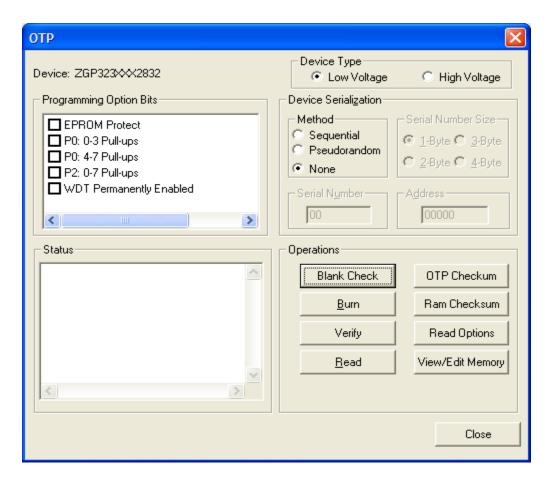


Figure 14. OTP Programming Window (ZDS II Current Project Example)

8. Click **Ram Checksum** button to calculate the checksum of the data in emulator RAM. Use this to compare with the OTP checksum after burning.

- ၁၀
- 9. Select the option bits to be programmed in the **Programming Option Bits** area
- 10. Select **None** button in the **Method** panel of **Device Serialization** to leave the serial number blank.
- 11 To load a serial number:
 - Select Sequential or Pseudorandom button in the Method panel.
 This determines how the serial number is incremented on subsequent burns.
 - Select the size of the serial number (1, 2, 3, or 4 bytes) in the **Serial Number Size** area.
 - Enter the starting serial number in the **Serial Number** field.
 - In the **Address** field, enter the address of the serial number.
- 12. Click **Blank Check** to verify that the OTP chip is actually blank.
- 13. Click **Burn** to program the OTP chip with the contents of emulator RAM. The OTP chip content value is also verified.
- 14. When the burn is complete, click **OTP** Checksum to calculate the checksum of data on the OTP chip and compare it to the **RAM** checksum calculated earlier.
- 15. Click **Close** to close the OTP Programming window.

Burn Code from an Existing Hex File

Follow the steps below to load an existing hex file into emulator RAM and burn an OTP chip:

- Connect the OTP programming module to the emulator as described in Connecting ZGP323 ICE to OTP Programming Module (Optional) on page 5.
- 2. Select the OTP chip to be burned and the appropriate package converter
- 3. Install the package converter, if used, into the ZIF socket on the OTP programming module.
- 4. Install the OTP chip to be burned into the ZIF socket on the OTP programming adapter. Match pin 1 of the chip with pin 1 of the ZIF socket.
- Note: Stop any current debugging process by selecting **Debug**—> **Stop Debugging** or press **Shift-F5** to stop debugging.
 - 5. In ZDS II, open the project for the code to be burned onto the chip.
 - 6. Select **Tools** —> **OTP Programming** to open the OTP window, see Figure 15 on page 30.

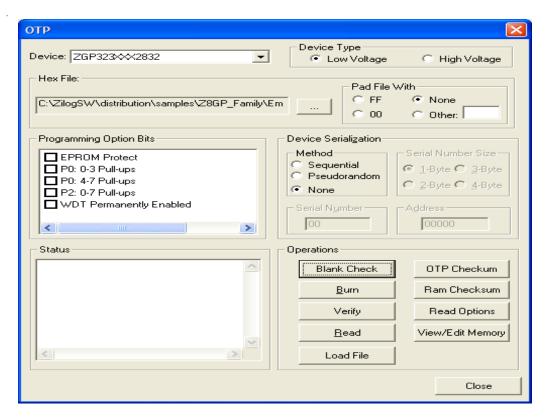


Figure 15. OTP Programming Window (Hex File Example)

- 7. Select the appropriate target device from the **Device** drop-down menu.
- 8. In the **Hex File:** section, click button and select the hex file to be burned on to the OTP chip.
- 9. If you do not want to pad the hex file, select the **None** button in the **Pad File With** panel. Otherwise, select **FF**, **00**, or **Other** button. If

you select the **Other** button, type the hex value to pad the file with in the text field provided with **Other**.

- 10. Click **Load File** to load the hex file into emulator RAM.
- 11. Click **Ram Checksum** to calculate the checksum of the data in emulator RAM. Use this to compare with the OTP checksum after burning.
- 12. Select the option bits to program in the **Programming Option Bits** area
- 13. Select None button in the Method panel of Device Serialization to leave the serial number blank.
- 14 To load a serial number:
 - Select Sequential or Pseudorandom button. This determines how the serial number is incremented on subsequent burns.
 - Select the size of the serial number (1, 2, 3, or 4 bytes) in the **Serial** Number Size area.
 - Enter the starting serial number in the **Serial Number** field.
 - In the **Address** field, enter the address of the serial number.
- 15. Click **Blank Check** to verify that the OTP chip is actually blank.
- 16. Click **Burn** to program the OTP chip with the contents of emulator RAM. The OTP chip contents is also verified.
- 17. When the burn is complete, click **OTP Checksum** to calculate the checksum of data on the OTP chip and compare it to the RAM checksum calculated earlier.
- 18. Click **Close** to close the OTP Programming window.

LED Indicators

There are three sets of dual LED indicators on the ZGP323 ICE, as described below:

- 1. The dual ICE RUN LED on the front panel, see Figure 5 on page 8, indicates emulator status. If the top LED is ON, the emulator is executing your system code. When the top LED is off, emulation has stopped. If the bottom LED is ON, the emulator is not functioning properly, contact technical support for assistance.
- 2. The dual 3.3 V DC/1.8 V DC LED on the rear panel, see Figure 4 on page 7, indicates the status of internal voltages. Both LEDs are normally illuminated when power is connected.
- 3. The dual LAN/LINK LED on the rear panel, see Figure 4 on page 7, indicates Ethernet status. The LINK LED indicates that the Ethernet connection is live. The LAN LED indicates that data is being transferred across the connected network.

External Interface Connectors

There are five external interface connectors (P8, P9, P10, J4, and J5) on the ZGP323 ICE as explained below:

- Connectors P9 and P10 are used to connect the emulator to the target pod and adapter board assembly, see Figure 1 on page 4.
- The OTP Programming connector P8 is used to connect the emulator to the OTP programming module.
- Connector J4 on the emulator front panel, see Figure 1 on page 4 and Figure 5 on page 8, provides a ground connection on all three pins.
- Connector J5 on the emulator front panel, see Figure 1 on page 4, provides access to the following functions:

- Pin 3 provides a HIGH external trigger out for use in triggering a device such as a logic analyzer or oscilloscope. Pin 3 is under software control, and can be activated through the ZDS II Trace and Event system. The trigger can be set to toggle or pulse.
- Pin 1 provides an input for an external HIGH or LOW trigger in, allowing use of an external trigger as an event for the ZDS II Trace and Event system.

Using J5 Pin 3, External Trigger Out

The ZGP323 ICE external trigger out feature is always enabled. Set the Trace and Event system parameters, before executing the code. When the set up event occurs, pin 3 of connector J5 goes HIGH and stays HIGH as long as the event is active. Longer the event window, longer the trigger out stays HIGH.

Using J5 Pin 1, External Trigger In

The ZGP323 ICE external trigger in feature can be enabled as follows:

- With the ledblink_c.zdsproj project open in ZDS II as described in Sample Project on page 18, select Tools —> Trace and Event System.
- In the **Trace and Event System** window, select an **Event** entry. In the **When** section, check **Trigger In** checkbox.
- Select either 0 or 1 to trigger on LOW or HIGH, respectively (edge-triggering not supported).
- Click OK to set the Trace and Event System parameters. If you set trigger=1 in the Trace and Event System window, then a HIGH on pin 1 of connector J5 generates an event in the ZDS II Trace and Event System. If you set trigger=0, then a LOW on pin 1 of connector J5 generates an event.

Z8 GP Package Support and Ordering Information

Table 2 lists the packages supported by ZGP323 ICE.

Table 2. Z8 GP Package Support

Chip Package	For OTP Programming order:	For In-Circuit Emulation, order:
20 SSOP	ZGP32302010ZDH	20-PDIP to 20-SSOP adapter from Ironwood, P/N: SOIC20-09
28 SSOP	ZGP32302810ZDH	28-PDIP to 28-SSOP adapter from Ironwood, P/N: SOIC28-08
48 SSOP	ZLP323ICE01ZAC*	ZLP323ICE01ZAC*
20 PDIP	Included in ZGP323ICE02ZEM kit	Included in ZGP323ICE02ZEM kit
28 PDIP	Included in ZGP323ICE02ZEM kit	Included in ZGP323ICE02ZEM kit
40 PDIP	Included in ZGP323ICE02ZEM kit	ZLP323ICE01ZAC*
20 SOIC	ZGP32302010ZDS	20-PDIP to 20-SOIC adapter from Ironwood, P/N: SOIC20-02
28 SOIC	ZGP32302810ZDS	28-PDIP to 28-SOIC adapter from Ironwood, P/N: SOIC28-02
Note: *ZLP323ICE01ZAC has been replaced by an improved version, ZCRMZNICE02ZACG.		

Note: For information on Ironwood adapters, visit http://www.ironwoodelectronics.com/

Appendix A-ZGP323 ICE **Commands**

Table 3 lists the ZGP323 ICE Commands.

Table 3. ZGP323 ICE Commands

Command	Description and Options	
?	Displays available emulator command shell options	
bpool	Displays buffer pool	
date	Displays current date	
debugport	Configures the TCP port usage: debugport-displays current settings debugport tcp_port-sets debugport to specified TCP port Example: debugport 4040 -sets debugport to TCP port 4040	
devs	Not used	
echo	Echoes arguments typed into the command line	
exit	Exits the command shell	
hang	Not used	
help	Displays available emulator commands	

Table 3. ZGP323 ICE Commands (Continued)

Command	Description and Options Configures the emulator network interface. Entering ifconfig with no options lists current configuration.	
ifconfig		
	The following command options are available:	
	• i–specifies IP address	
	• s–specifies subnet mask	
	 g–specifies a network gateway address 	
	• dhcp—configures the emulator network interface to look for a dhcp host to obtain network settings	
	Example: ifconfig i 192.168.1.1 s 255.255.255.0 g 192.165.1.254 configures the emulator to use IP address 192.168.1.1 on subnet 255.255.255.0 with gateway address 192.168.1.254 ifconfig dhcp on configures the emulator to use DHCP	
kill	Not used	
mem	displays memory usage information	
password	Not used	
port	Displays port information	
ps	Displays a list of processes running on the ICE by process id number	
reboot	Reboots the emulator	
restore	Restores factory default network interface settings	
sem	Displays semaphore information	
sleep	Not used	
time	Displays current time and date	

Customer Support

For answers to technical questions about the product, documentation, or any other issues with Zilog's offerings, please visit Zilog's Knowledge Base at http://www.zilog.com/kb.

For any comments, detail technical questions, or reporting problems, please visit Zilog's Technical Support at http://support.zilog.com.

UM019606-0408 Customer Support

Z8 GP™ ZGP323 In-Circuit Emulator User Manual





Warning: DO NOT USE IN LIFE SUPPORT

LIFE SUPPORT POLICY

ZILOG'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS PRIOR WRITTEN APPROVAL OF THE PRESIDENT AND GENERAL COUNSEL OF ZILOG CORPORATION.

As used herein

Life support devices or systems are devices which (a) are intended for surgical implant into the body, or (b) support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in a significant injury to the user. A critical component is any component in a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system or to affect its safety or effectiveness.

Document Disclaimer

©2008 by Zilog, Inc. All rights reserved. Information in this publication concerning the devices, applications, or technology described is intended to suggest possible uses and may be superseded. ZILOG, INC. DOES NOT ASSUME LIABILITY FOR OR PROVIDE A REPRESENTATION OF ACCURACY OF THE INFORMATION, DEVICES, OR TECHNOLOGY DESCRIBED IN THIS DOCUMENT. ZILOG ALSO DOES NOT ASSUME LIABILITY FOR INTELLECTUAL PROPERTY INFRINGEMENT RELATED IN ANY MANNER TO USE OF INFORMATION, DEVICES, OR TECHNOLOGY DESCRIBED HEREIN OR OTHERWISE. The information contained within this document has been verified according to the general principles of electrical and mechanical engineering.

Crimzon and Z8 GP are the trademarks or registered trademarks of Zilog, Inc. All other product or service names are the property of their respective owners.