Z87000

ICEBOX

User's Manual

UM010302-0601

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Z87000
ICEBOX

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Document Disclaimer

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About This Manual

We recommend that you read and understand everything in this manual before setting up and using the product. However, we recognize that users have different styles of learning: some will want to set up and use their new emulator while they read about it; others will open these pages only as a “last resort” to check on a particular specification. Therefore, we have designed this manual to be used either as a “how to” procedural manual or a reference guide to important data.

Additional assistance is provided in the following ways:

- The emulator graphical user interface (GUI) features a complete, context-sensitive on-line help facility that provides brief messages on keyboard and ICEBOX commands and various procedures on how to use the emulator. An index and glossary are also included as part of this Help Program.

- The complete emulation board schematic diagram is included at the back of this user's manual.

Please fill out and return the enclosed Zilog Registration Card as soon as possible so we can advise you of updates and improvements to your emulator.

Z87000 ICEBOX™ User's Manual

Table of Contents

TABLE OF CONTENTS
(Continued)

TITLE **PAGE**

CHAPTER 1
INTRODUCTION

OVERVIEW

Congratulations on selecting a fine development tool! The Zilog Z87000 In-Circuit Emulator (ICEBOX™) is carefully engineered to provide the best balance between reasonable cost and useful features to shorten your development time for Z87000-based products (refer to the "Supported Zilog Devices" section). The emulator graphical user interface (GUI) runs under MS-Windows.

KEY FEATURES OF THE ZILOG EMULATOR

- The contents of Program Memory or the registers can be edited, memory locations tracked, break points set in ROM, and you can single-step into codes.
- Multiple windows can be viewed and the contents of Program Memory, DSP RAM, and registers can be edited.
- Multiple emulators can be operated simultaneously, provided enough serial communication ports on your PC are available.
- Because of the multitasking feature of the emulator GUI, you can use other Windows applications while the emulator GUI is running.
- Even if you have not yet built your design, you can learn about the emulator and start writing and debugging software using the memory available in the emulator.

SUPPORTED ZILOG DEVICES

Z87000

GUI-SUPPORTED COMPILER, ASSEMBLER FORMATS

The emulator GUI supports object (binary or Intel hex) produced by the Production Languages Corporation (PLC) Z89C00 C compiler or assembler.

HARDWARE SPECIFICATIONS

Dimensions	2.5in H x 6.25in W x 9.5in D
Target Clock or Oscillator Frequency	32.768 MHz (operating frequency is 16.384 MHz)
Host Interface	DB-25, RS-232 DCE (TxD, RxD only)
Serial Baud Rate	19,200 bps
Power Supply Voltage	+4.75 VDC to +5.25 VDC Max (+5.0 VDC typical)
Power Supply Current	1.5 A typical
Operating Temperature	20 degrees C, ±10 degrees C
Operating Humidity	10-90% RH (non-condensing)

SUPPORT PRODUCTS PACKAGE CONTENTS

The Zilog Emulator Support Products Package contains the following items:

Hardware

Z87000 ICEBOX Emulator
Emulator–to–84-Pin PLCC Target Cable
RS-232 Cable
Power Cable (Pigtail)

Software

GUI Diskette

Description of GUI Diskette Files

dspcfg.o	Configuration
dspice.exe	Executable
icehelp.hlp	Help
meter.dll	Installation library
readme	Text file
setup.inf	Installation information
setup.exe	Windows install program

Description of GUI Diskette Files (Continued)

z8em_c00.o	On board software for Z89C00 Emulator
z8em_309.o	On board software for Z89309 Emulator
z8em_371.o	On board software for Z89371 Emulator
z8em_700.o	On board software for Z87000 Emulator

Publications

Zilog Z87000 ICEBOX™ User's Manual
Registration Card

REQUIREMENTS

Minimum Hardware

An IBM PC (or 100 percent compatible) 386-based machine at 20 MHz with 4 MB RAM, hard disk drive (with 1 MB available), 5.25- or 3.5-inch floppy disk drive, and VGA video adapter.

Note: A 486-based machine will provide increased overall performance.

Minimum Software Operating Systems

MS-DOS version 5.0
MS-Windows version 3.0

Additional Required Items Not Supplied with the Support Package

A source of power (+4.75 VDC to +5.25 VDC Max [+5.0 VDC typical]) for the emulator. This can be a laboratory power supply with supply current of 1.5 ampere.

Production Languages Corporation (PLC) Z89C00 C compiler or assembler.

Your Z87000-Based Design

Typically, this is a wire-wrapped or printed-circuit prototype that includes a socket for the Z87000 device, into which you can plug the emulation cable from the emulator.

Note: This emulator is designed for emulation purposes only and cannot be used in stand-alone operation.

Optional Recommended Items

- Oscilloscope
- Logic Analyzer
- SMA Cables (Swift part no. A11RC316A11-018 or equivalent)

CHAPTER 1
INTRODUCTION

OVERVIEW

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Optional Recommended Items

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- Logic Analyzer
- SMA Cables (Swift part no. A11RC316A11-018 or equivalent)

CHAPTER 2
SETUP AND INSTALLATION

INSTALLING THE SOFTWARE

To properly install the Emulator GUI, first start the Windows application, then follow these steps:
1. Load the Emulator GUI diskette into compatible disk drive.
2. Select the Run command from the File menu, located under Windows Program Manager.
3. Type in the following at the prompt:
   "a:\setup" (or "b:\setup" if the diskette is in drive B:)

A dialog box will now prompt you for the directory into which the software will be installed (default is C:\DSPICE).

The setup program will copy the files into the target directory, creating a DSP-ICE icon in the Windows environment.

After the installation is finished, you can move the DSP-ICE icon into any program group of your choice.

Notes:
1. The installation procedure does not modify the "win.ini", "autoexec.bat" or "config.sys" files.
2. An alternative way to install the Emulator GUI software is to copy all the files described in the following section to your target directory and manually create a program item by using the "New" command under the File menu of the Windows Program Manager. (Consult MS-Windows documentation if you need additional information about alternate install procedures.)

INSTALLING THE HARDWARE

Before installing the hardware, refer to Figure 2-1 for a rear view of the “generic” emulator and Figure 2-2, which provides a diagram for connecting the emulator to your PC and power supply.

Note: Proper functioning of the emulator assumes that the GUI software has been properly installed and runs correctly on your PC.

Quick Installation

This section provides you with a quick overview of the steps involved in setting up the hardware. The "Complete Hardware Installation" section, which immediately follows, provides a more detailed description of the hardware setup procedure.

1. Connect to a +5V power supply and adjust to 1.5A (min.).
2. Connect the serial cable to the PC.
3. Connect the emulator to your design.
4. Set up the option jumpers. (Refer to the "Setting Up the Z87000 Option Jumpers" section.)
5. Connect the emulator to a logic analyzer (if using).
6. Power up the emulator. (Refer to "Powering Up" and "Powering Down" procedures.)

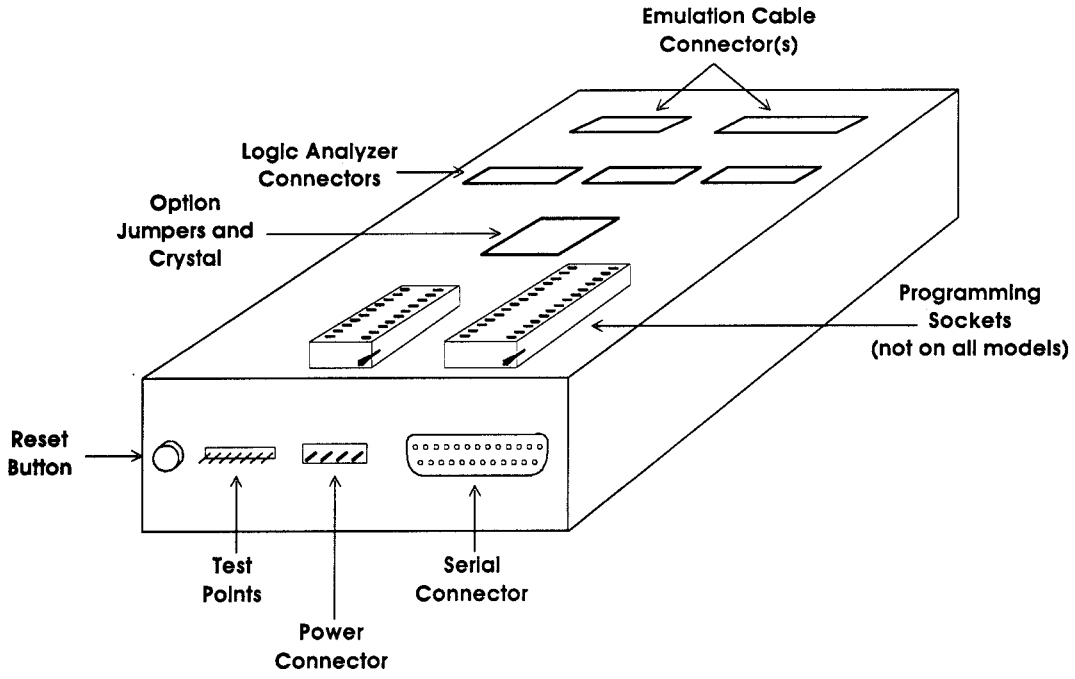

Figure 2-1. “Generic” Emulator (Rear View)

Complete Hardware Installation

Connecting to a Power Supply. If your power supply allows voltage adjustment, do the following:

1. Turn the power supply on and adjust it to +5V.
2. Set it for at least 1.5A, if there's a current-limiting adjustment.
3. Turn the supply off or make sure a nonadjustable supply is off.
4. Locate the power cable (red wire, black wire, and banana plugs on one end). Plug in the black banana plug into the black jack on the power supply (labeled COM, GND, or with a ground symbol). Plug in the red plug into the red jack on the power supply (labeled "+" or "+V" or "+5V").
5. Plug the white connector on the other end of the cable into the matching 4-pin connector on the back of the emulator. (This connection is "keyed" to ensure against an improper connection.)

Connecting the Serial Cable to the PC. Locate the serial cable and connect the male end to the female connector on the back of the emulator, then connect the female end to either the COM1, COM2, COM3, or COM4 connector of your PC.

Note: If connector availability is limited to a 9-pin COM1 through COM4, use a different cable or a 25- to 9-pin converter. (Zilog does not provide either of these items.)

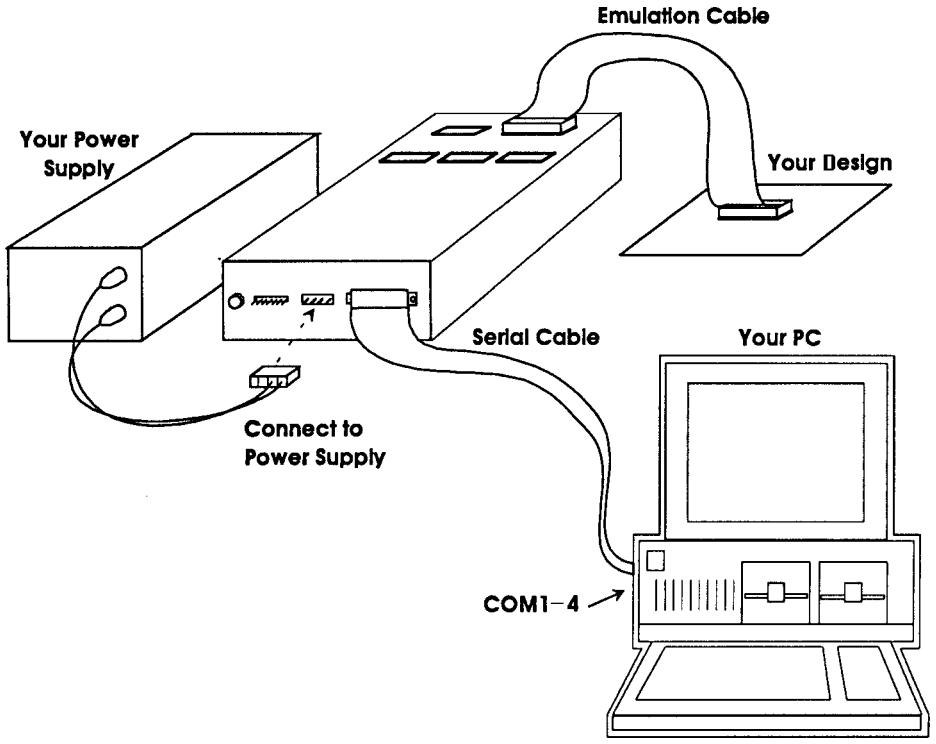

Figure 2-2. Emulator Hook-Up Diagram

INSTALLING THE HARDWARE (Continued)

Connecting to Your Design. (If your design is ready.) Locate the emulation cable for your Z87000-based design.

Note: Wear a properly grounded wrist strap or similar ESD protection before proceeding with this step.

Plug one end of the emulator cable into your Z87000 socket, being **very careful** to orient the Pin 1 marking to match the way your board is built. Plug the other end of the cable into the matching blue connector on top of the emulator.

Connecting a Logic Analyzer (Optional). The logic analyzer can be connected as part of initial setup (or later as you continue working with your parts).

Notes:

1. Some ICEBOX emulators include several gray connectors or a 100-pin connector on top for easy connection to logic analyzers. (For example, the Hewlett-Packard 165xx Family has 16 signals and a clock and ground per pod (channel). An ICEBOX emulator with a 100-pin connector requires a H-P analyzer interface board (P/N Z89C0000ZHP from Zilog).

2. The inductance and capacitance of the emulation cable may affect the signals to and from the emulator and target board, especially if the target board has low-current drivers, pull-ups, and pull-downs.

Setting Up the Z87000 Option Jumpers. The option jumpers are accessible on top of the emulator (see Figure 2-3).

Each emulator is shipped with a standard oscillator, typically 32.768 MHz.

The option jumpers, which are located on the top cover, allow you to configure things like whether the emulator provides power to your design on the V_{CC} pin(s) of the emulated device, and how the clock pin of the emulated Z87000 is connected (refer to Table 2-1).

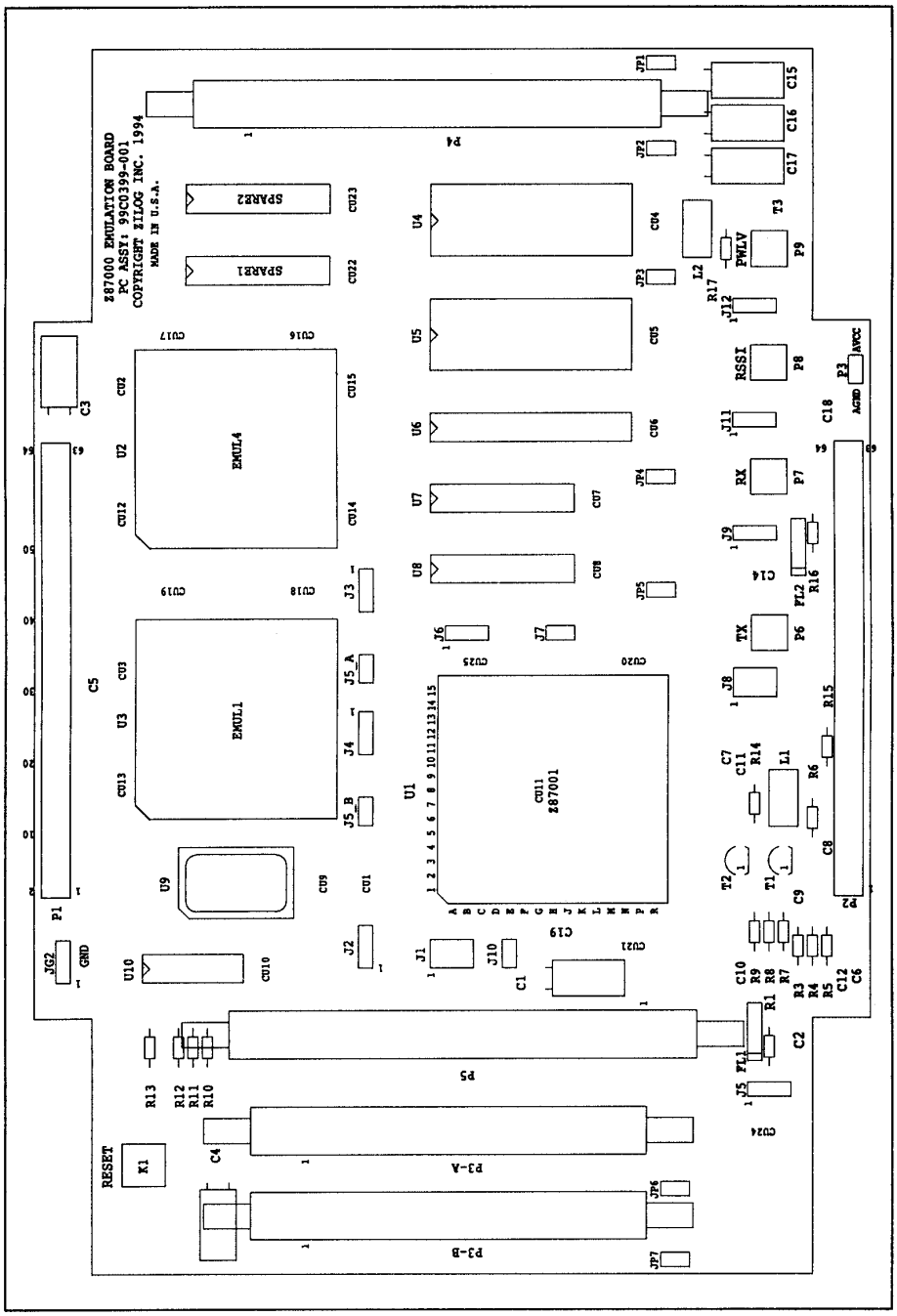

Figure 2-3. Emulator (Top View) for Jumper Locations

INSTALLING THE HARDWARE (Continued)

Table 2-1. Top-Access Option Jumpers

Jumper	Pin	Position	Description
J1	1–2	In	Emulator supplies power to target board via V_{CC} pin(s) of Z87000.
		Out	Emulator power is isolated from the target board.
J1	3–4	In	Emulator analog V_{CC} is connected to the target board via AV_{CC} pins of the Z87000.
		Out	Emulator analog V_{CC} is isolated from the target board.
J1	5–6	In	Emulator analog GND is connected to target board via AGND pin(s) of Z87000.
		Out	Emulator analog GND isolated from the target board.
J5_A	1–2	In	The clock pin of the Z87000 ICE chip is connected to the on-board oscillator (remove J5_B jumper).
		Out	Z87000 clock is not interconnected.
J5_B	1–2	In	The clock pin of the Z87000 ICE chip is connected to the clock pin of the Z87000 socket. The target oscillator provides the clock to the emulator (remove J5_A jumper).
		Out	Z87000 clock is not interconnected.

Table 2-2. Other Option Jumpers

Jumper	Pin	Description
J2	1–2	Test pin is connected to the target board.
	2–3	Test Mode is disabled.
J3	1–2	PA bus is controlled by the emulator.
	2–3	PA bus is connected permanently.
J4	1–2	Interrupt enable is controlled by the emulator.
	2–3	Interrupt is enabled permanently.
J6	1–2	Disable ICE Mode.
	2–3	Enable ICE Mode.

Table 2-2. Other Option Jumpers (Continued)

Jumper	Pin	Position	Description
J5	1 to 2	In	The Tx output signal from the Z87000 chip is connected to the on-board IF filter and amplifier.
	Or		
J5	2 to 3	In	The Tx output signal from the Z87000 bypasses the on-board filter and amplifier.
J7	1–2	In	Configure Z87000 as Base Station.
		Out	Configure Z87000 as Handset Station.
J8	5 to 6	In	The Tx signal from Z87000 is connected to P6 (SMA connector) of the ICEBOX.
	Or		
J8	1 to 3	In	The Tx signal from the on-board amplifier and filter is connected to the
	4 to 6	In	P6 (SMA connector) of the ICEBOX.
J8	1 to 2	In	The Tx signal from the on-board amplifier and filter is connected to the P3-A of the ICEBOX.
	Or		
	3 to 5	In	The Tx signal from the Z87000 is connected to the P3-A of the ICEBOX.
	2 to 4	In	The Tx signal from the Z87000 is connected to the P3-A of the ICEBOX.
J9	1 to 2	In	The Rx signal of the Z87000 is connected to the P3-A connector of ICEBOX.
J9	2 to 3	In	The Rx signal of the Z87000 is from the P7 (SMA connector).
J10	1 to 2	In	The Vref signal on the Z87000 pod (U_Vref) is connected to the Z87000 chip.
		Out	The Vref signal is not interconnected.
J11	1 to 2	In	The RSSI signal into the Z87000 is from the pod connector P3-A (U_RSSI).
J11	2 to 3	In	The RSSI signal into the Z87000 is from the P8 (SMA connector on ICEBOX).
J12	1 to 2	In	The PWLV signal from the Z87000 is to the pod connector P3-A (U_PWLV).
J12	2 to 3	In	The PWLV signal from the Z87000 is connected to the P9 (SMA connector on ICEBOX.)

FACTORY INSTALLED JUMPERS

The following jumper settings allow the Z87000 chip to operate in ICE mode, with the V_{CC} and 16.384 MHz clock from the Z87000 ICEBOX. Analog V_{CC} and Digital V_{CC} are the same.

Z87000 Control Jumpers

Table 2-3. Control Jumpers

Jumper	Pin	Position
J1	1 to 3	In
	5 to 6	In
J2	2 to 3	In
J3	1 to 2	In
J4	1 to 2	In
J5_A	1 to 2	In
J6	2 to 3	In
J7	1 to 2	In

Z87000 Analog Interface Jumpers

Jumpers shown in Table 2-4 bypass the on-board amplifier, filter, and SMA connections. The U_TX, U_RX, U_RSSI, and U_PWLV are connected to the pod connector P3-A of the Z87000 ICEBOX. (Refer to "Appendix B: Emulator Schematics" for more details).

Table 2-4. Z87000 Analog Interface Jumpers

Jumper	Pin	Position
J5	2 to 3	In
J8	3 to 5	In
	2 to 4	In
J9	1 to 2	In
J11	1 to 2	In
J12	1 to 2	In

Notes:
1. Jumpers not shown on Tables 2-3 and 2-4 are not jumped.
2. Due to the pod and pod cables, the electrical characteristics of the emulator's Rx and Tx pins cannot match the characteristics of the chip (such as attenuation and impedance). The emulator amplifier can be used to compensate for the pod's attenuation. However, exact matching of the RF analog interface should be done with the stand-alone Z87000 chip, not with the emulator.

USER JUMPER OPTIONS

For IF communication between Z87000 ICEBOX emulators with on-board analog filter and amplifier and on-board SMA connections for Tx, Rx, RSSI, and PWLV signals.

Notes: For this configuration, the user must provide SMA cables. Refer to the "Optional Recommended Items" in Chapter 1 for connecting the two ICEBOX emulators (signals Tx to Rx, Rx to Tx, RSSI, and PWLV).

Table 2-5. User Jumper Options—On-Board Analog Filter and Amplifier and On-Board SMA Connections

Jumper	Pin	Position
J5	1 to 2	In
J8	1 to 3	In
	4 to 6	In
J9	2 to 3	In
J11	2 to 3	In
J12	2 to 3	In

For IF communication between Z87000 ICEBOX emulators with on-board analog filter and amplifier and off-board connections for TX, RX, RSSI, and PWLV signals.

Table 2-6. User Jumper Options—On-Board Analog Filter and Amplifier and Off-Board Connections

Jumper	Pin	Position
J5	1 to 2	In
J8	1 to 2	In
J9	1 to 2	In
J11	1 to 2	In
J12	1 to 2	In

WARNING:

If your design already has a power supply, **do not** power from the emulator V_{CC} pin.

Powering Up. If anything unusual (such as unexpected sounds and smells) occurs the first time you turn on the power supply, quickly turn off the power supply and check your connections. If your power supply allows voltage adjustment, adjust it again to +5V. (The value may be somewhat lower than +5V because of the load of the emulator.) If it has a current meter, ensure that the emulator is drawing within the rated current.

After power-up, depress the RESET button. If the emulator is not powering your design through the V_{CC} pin, turn on the power supply of the design.

Powering Down. When powering down, follow the procedure described below:
1. Power-down the target application board (if using its own power supply).
2. Remove the target pod.
3. Power-down the emulator.

EMULATOR OPERATION

Resetting the Emulator. Pressing the RESET button on the emulator resets the state of the target device and much of the status that you establish using the GUI. For example, it resets the emulated ROM size to 32 Kwords, and clears all 32 Kwords Breakpoint ROM. If your application board drives the /RESET pin of the device socket Low, the target device is reset. For example, it sets the Program Counter according to the reset vector of the Z87000, but does not affect most of the other GUI and emulator status.

Note: After reset, you must wait a minimum of 5 seconds (for completion of self tests) before starting GUI.

WARNING:

To run the emulator, you must always press the RESET button on the emulator **before** selecting the DSP-ICE icon.

ROM Size. The emulator has a selectable ROM size 16K or 32K (default).

Breakpoint Implementation. The emulator bases its breakpoint facility completely on addresses, rather than on inserting special “Trap” instructions into the program, which means you can set breakpoints in ROM on your target board. The emulator reads a 32Kx1 static RAM for each cycle emitted by the device during code execution.

Note: When the emulator reaches the breakpoint, it will execute the code of the breakpoint address and the next address before stopping.

CHAPTER 3
EMULATOR SAMPLE SESSION

EMULATOR SAMPLE SESSION

This sample session is designed to introduce you to the features of the graphical user interface (GUI) software and thoroughly acquaint you with the various GUI windows you will be using in this program. For best results, follow the steps in sequential order. Topic headings (such as “Using the Debug Window”) have been added to the Sample Session Procedure so you can better pinpoint specific topical “how to” information.

The chapter concludes with some brief notes and some figures that help explain the multiple window and multitasking capabilities of the GUI software. (Refer to Chapter 4: Summary of Menus, Commands, and Operations for more information about all elements of the GUI.)

Note: In order to properly demonstrate the program features, be prepared to import sample files (at procedural step 8) in this session. You can download Zilog sample files from Zilog's Bulletin Board Service (ZBBS). (Refer to Appendix A for the procedure to obtain these files.)

Starting the Application

1. Press the RESET button on the emulator.
2. Double click the DSP-ICE icon.
   Confirm the COM port connections; change the default if necessary. The change is saved and will become the new default the next time around. If the communication attempt between PC and the emulator fails, you may have to check the connection or reset the emulator.
3. Wait for the initialization procedure to complete.
4. Select the emulator ROM size, which affects the size of the code file that you can download (refer to Figure 3-1, which shows this value as "32K".
5. Click the OK button to continue (or the CANCEL button to quit), after the self-testing results are displayed.

Microcontroller Emulation

6. "Z87000" is automatically selected and displayed in the MicroController List Box, which is a part of the Configuration Dialog Box (see Figure 3-1).

EMULATOR SAMPLE SESSION (Continued)

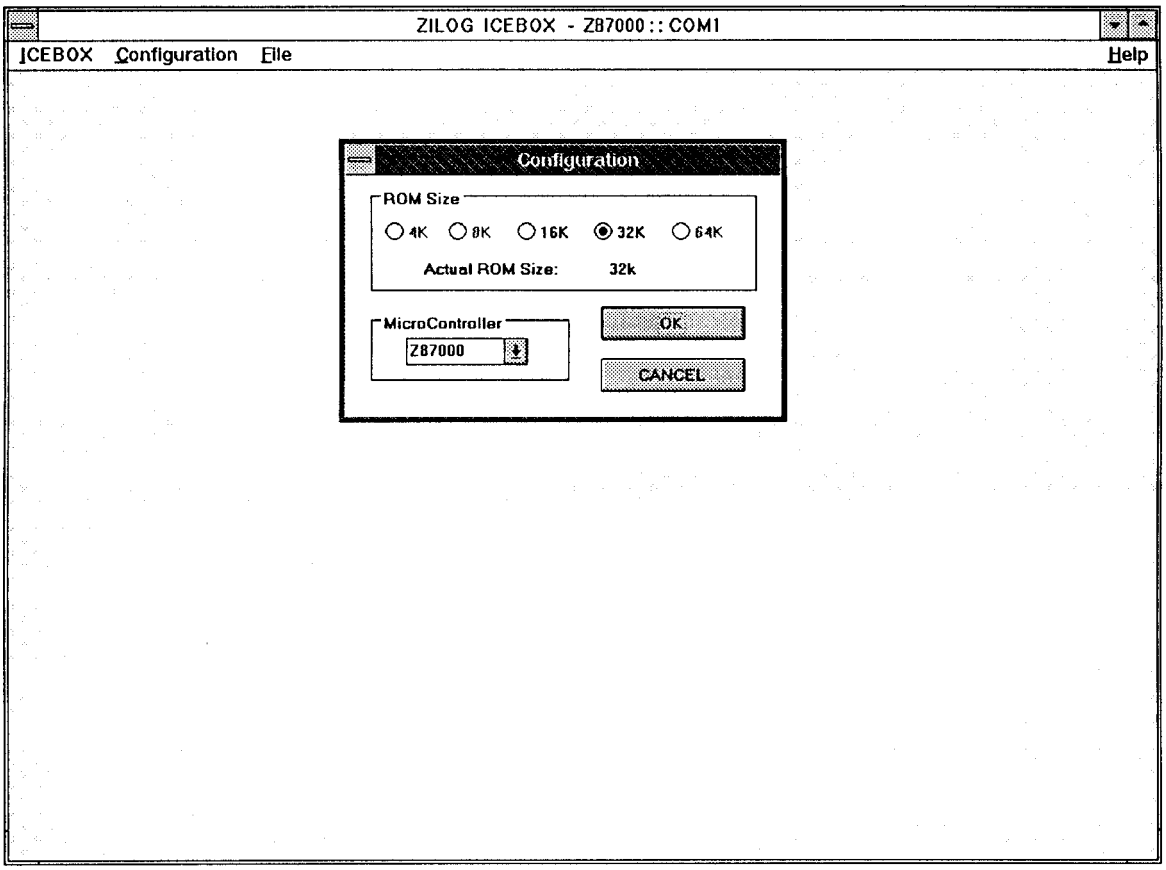

Figure 3-1. Zilog ICEBOX Configuration Dialog Box

Note: The emulation ROM size is automatically indicated (see Figure 3-1, which shows this value as "32K").

7. Click on the OK button (or depress the RETURN key) to accept the configuration.
8. Open the DSP Memory window under the menu named ICEBOX.
   If the characters are either too small or too large, use the Font Size menu to choose an appropriate font size. You can scroll up and down the memory space, "size" the window, make direct memory changes, and use the tracking facility to reach a particular memory location.

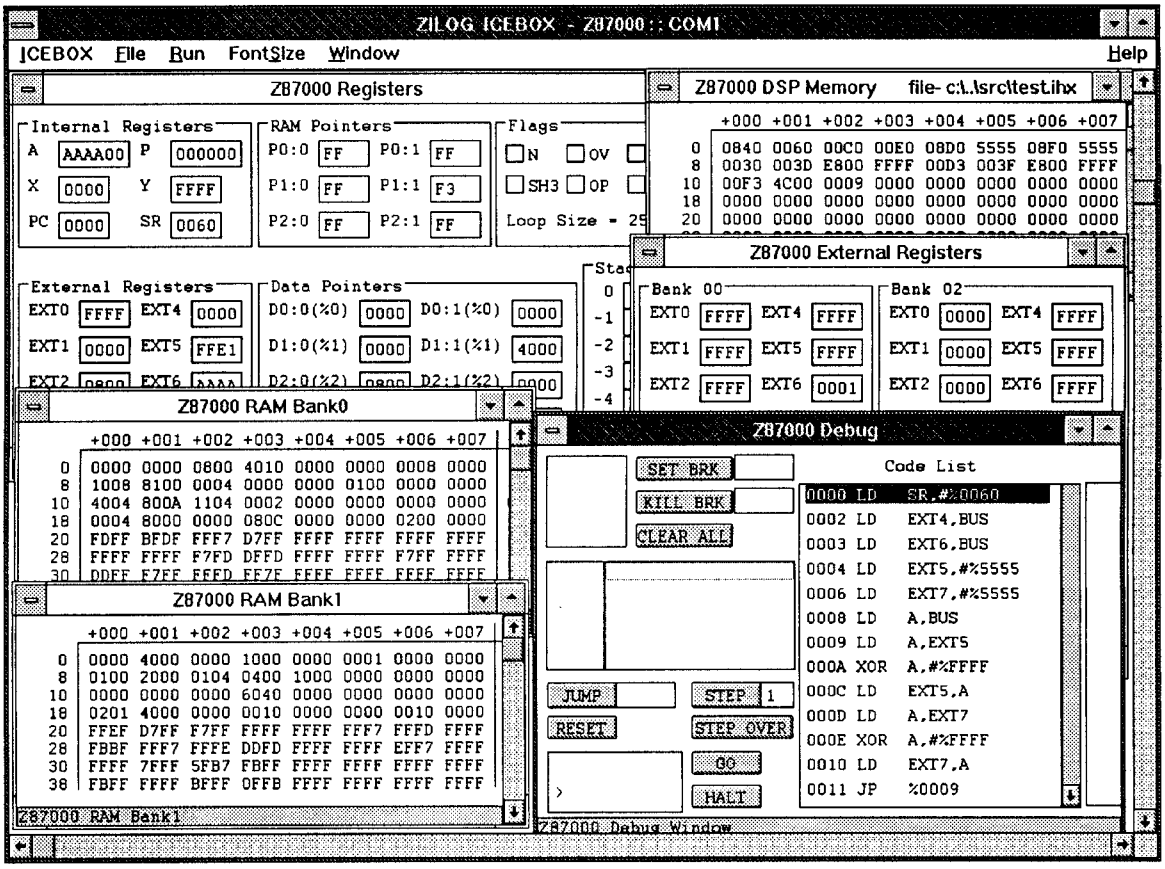

Figure 3-2. Various ICEBOX Windows

Monitoring/Modifying/Downloading Files

9. Use the File menu to download your sample file to the DSP Code Memory (refer to Appendix A: How to Receive Zilog Sample Files). The Code Memory window is updated to show the current memory content.

   Note: When downloading a hexadecimal file, the file size showing in the file downloading dialog box is the size of the memory the downloaded file will occupy, not the actual file size.

10. Open a RAM Bank window and modify the values of the register pointers.
11. Open the Registers window and modify the registers.

EMULATOR SAMPLE SESSION (Continued)

Using the Debug Window

12. Open the Debug window.
    The content of the Program (DSP) Code Memory is disassembled and listed here. You can do line-down or page-down to get around in the code list, but **page-up or line-up is not supported**. You can do a direct jump to any particular memory address.
13. Set a break point and start the program by clicking the GO button.

    Notes:
    1. The mouse cursor is changed to a sand glass shape. The only action allowed after a "GO" is halt. If there are no break points, click on the HALT button to halt the execution.
    2. If the application inadvertently goes into STOP Mode, the only way to halt the emulator execution is by doing a Stop-Mode Recovery (as defined by the user program). You may also reset the application using the RESET button.

14. Click on the HALT button to halt an execution.

Window Refresh

15. Double click on caption bar of the Register window to refresh it and check the value of the registers.

Saving and Quitting

16. Select "Save Session" from the File menu to save the current setting in a session file.
    The next time you use the interface, you can reload the last session by using the "Load Session" command in the File menu.
17. Quit the application.

RUNNING MULTIPLE INSTANCES

The emulator will allow several emulators running at the same time, if your PC has more than one communication port. Figure 3-3 shows two emulators running at the same time.

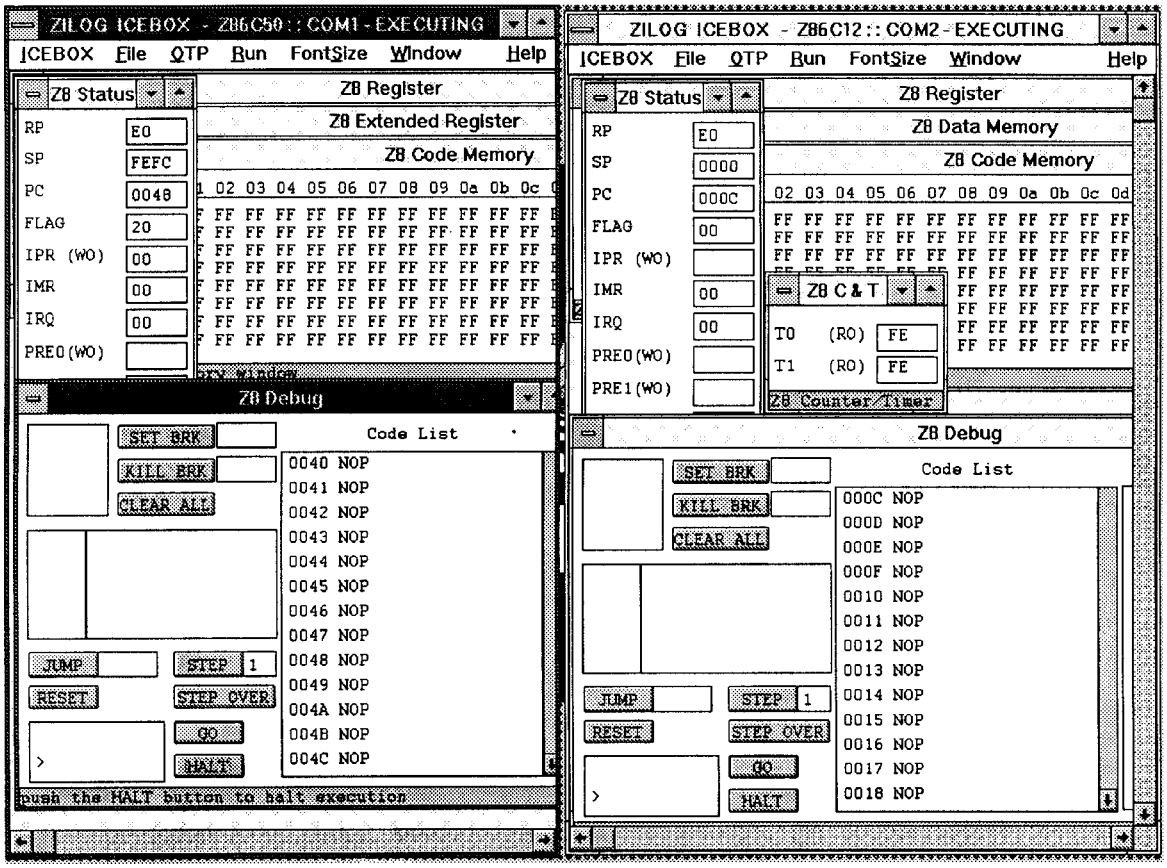

Figure 3-3. Running Multiple Instances

Note: Running multiple instances of the emulator GUI (two or more emulators running simultaneously) requires more memory than single-emulation operation; therefore, we recommend using a PC with 8 Mbytes RAM. In addition, two more communication ports are needed when running multiple instances.

MULTITASKING WITH OTHER WINDOWS APPLICATIONS

You can simultaneously run your emulator and other windows applications. Figure 3-4 shows an emulator working under the MS-Windows multitasking environment.

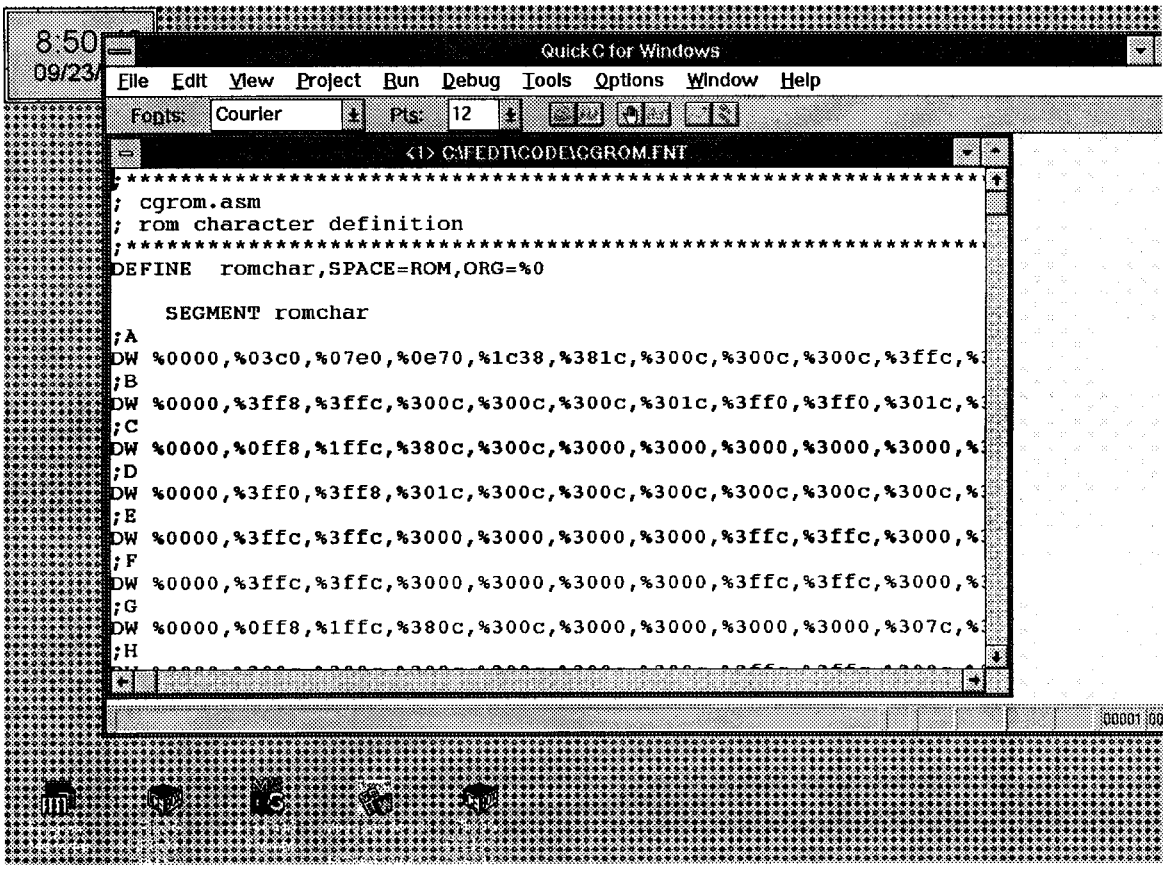

Figure 3-4. Multitasking with Other Windows Applications

CHAPTER 4
SUMMARY OF MENUS, COMMANDS, AND OPERATIONS

MAIN MENU

ICEBOX **Configuration** **File** **Help**

The Main Menu window of the emulator graphical user interface (GUI) is displayed after the GUI program is started. The following menu items can be accessed from this Main Menu:

- ICEBOX Menu
- Configuration Dialog Box
- File Menu
- Help

Each of these Main Menu items, along with all windows, subset menus, menu items, commands, and operations, are summarized in the following sections of this chapter.

CONFIGURATION DIALOG BOX

At start-up, the emulator GUI automatically detects which emulator is in use. The Configuration Dialog Box indicates the microcontroller and the ROM size that is emulated. The code file downloaded to DSP Code Memory is limited to the ROM size indicated. Click the OK or CANCEL button to confirm or cancel the configuration.

FILE MENU

File-related commands are grouped under this menu. These commands are briefly described below.

Download To DSP Code Memory: Download a sample of Intel hexadecimal (hex) or binary format code to Code Memory. (Note that when downloading a hex file, the file size showing in the file downloading dialog box is the size of the memory the downloaded file will occupy, not the actual file size.)

A list of available directories, files, and extensions is shown, along with address format (Word or Byte). There is also a Memory Pad option (FF, 00, or nothing).

FILE MENU (Continued)

Upload DSP Memory:

Save DSP Code Memory (part or whole) to a file in binary or Intel hex format.

The "Save DSP Memory" window (shown as Figure 4-1) contains text and list boxes for directories, file names, start and end addresses, and option buttons to indicate file format (binary or Intel hex).

Command Buttons: The SAVE ALL button saves all memory to file; the SAVE button saves only that part of the file delimited by the "Start" and "End" addresses.

Open Session:

Load a previously saved session.

Save Session:

Save the information of the current session: window positions, code file name, debug flags, font size, and so on, into a file that has a default extension ".prj."

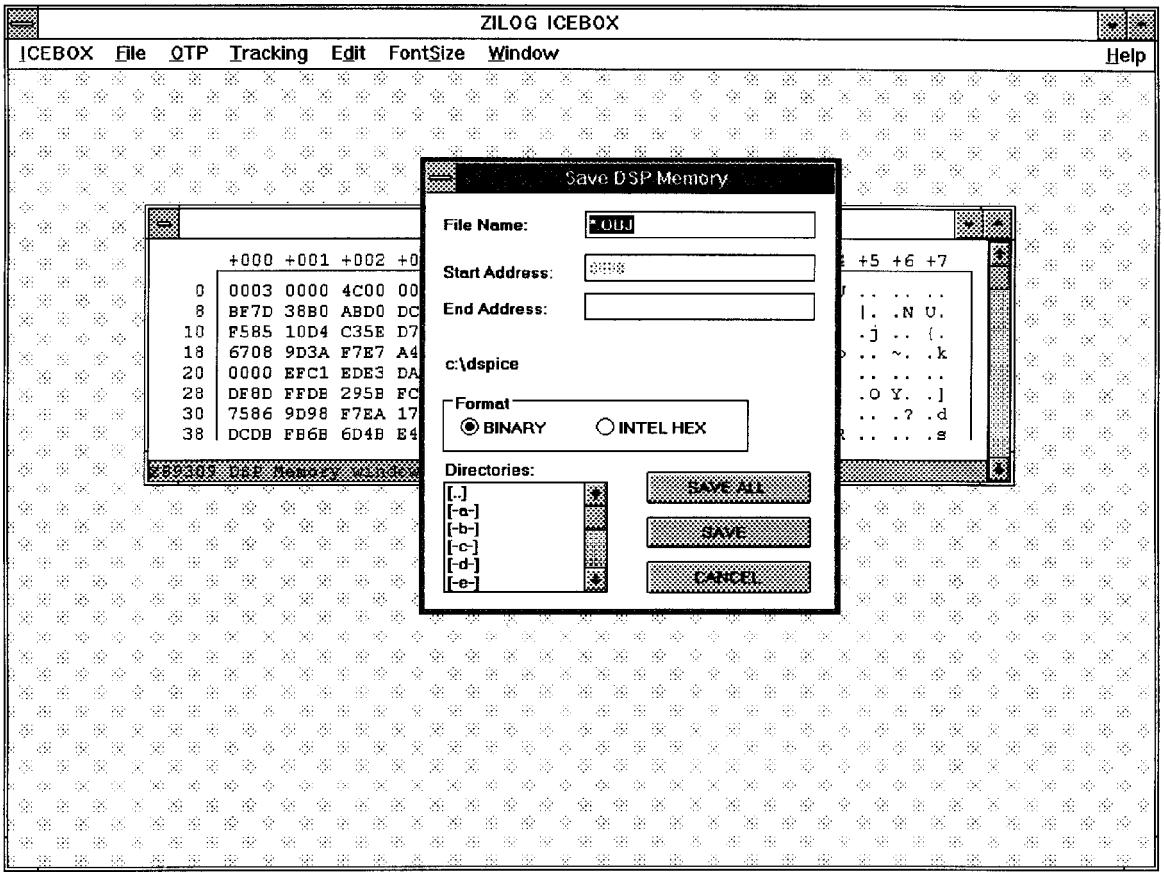

Figure 4-1. Upload DSP Memory Window

ICEBOX MENU

ICEBOX	Configuration	File	Help

Registers
Ext. Registers
DSP Memory
RAM Bank0
RAM Bank1
Debug
Exit

The following sections briefly discuss each of the ICEBOX menu items (listed above under "ICEBOX") and their associated menu bars and windows.

Registers Menu

The following menu bar is displayed when Registers is selected:

ICEBOX	File	Font Size	Window	Help

This Registers window displays the DSP internal and external registers, RAM and data pointers, flags, and stack. Editing can be done directly at the location of the cursor.

Ext. Registers Window

The Ext. Registers window shows four banks: Bank 00, Bank 01, Bank 02, and Bank 03. The registers can be edited if write- or rewritable; read-only registers cannot be edited.

ICEBOX MENU (Continued)

DSP Memory Menu

ICEBOX	File	Tracking	Edit	Font Size	Window	Help

Absolute Address
@Register
Program Counter

Selecting "Tracking" from the DSP Memory Menu (from the ICEBOX Menu) produces the menu items shown under the Tracking Menu Bar above. Each of these menu items are now briefly discussed.

Absolute Address

You can track to a register by its absolute address by entering the absolute address value in the dialog box that appears when Absolute Address is selected from the ICEBOX Tracking menu. The Absolute Address Dialog Box is shown in Figure 4-2.

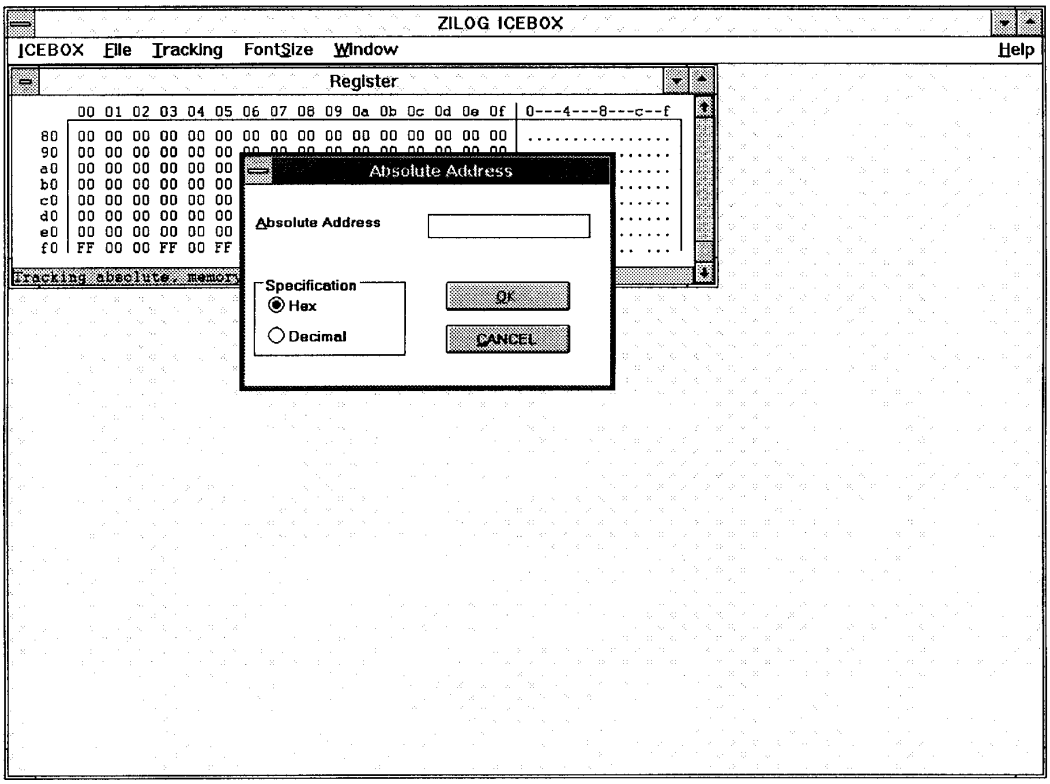

Figure 4-2. ICEBOX Absolute Address Tracking Window.

@Register

Register values are displayed in both hex and decimal format. The Register window includes RAM0 and RAM1 option buttons.

Program Counter

The Program Counter Message Box displays the program value in hex format.
Note: Register pointer tracking is not implemented in this revision.

ICEBOX	File	Tracking	Edit	Font Size	Window	Help
			Fill			
			Clear All			

Edit

Selecting "Edit" from the DSP Memory Menu (under the ICEBOX Menu) produces two menu items: Fill and Clear All. The Fill Dialog Box has entry fields for Start Address, End Address, and String Filled (refer to Figure 4-3). "Clear All" provides the option of filling DSP Code Memory with the FF (hex) value.

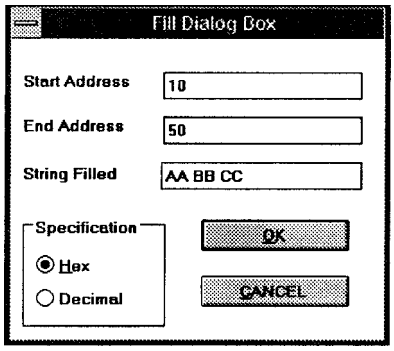

Figure 4-3. ICEBOX DSP Memory Edit Menu Showing Fill Dialog Box.

ICEBOX	Configuration	File	Help
Registers			
Ext. Registers			
DSP Memory			
RAM Bank0			
RAM Bank1			
Debug			
Exit			

RAM Bank0 Window

This window displays (in Word format) the available RAM Bank0 registers. Direct editing is available.

RAM Bank1 Window

This window displays (in Word format) the available RAM Bank1 registers. Direct editing is available.

ICEBOX MENU (Continued)

Debug

Selecting Debug from the ICEBOX menu displays the following menu bar:

ICEBOX	File	Run	Font Size	Window	Help

The Debug window allows you to view the assembly code, set break points, trace through the code, and perform other debug operations. The Run menu and associated menu items are summarized, followed by brief descriptions of the Debug window elements.

ICEBOX	File	Run	Font Size	Window	Help

Trace Code
Trace Call
Animate
Clear Trace

Run

Selecting the Run menu displays four menu items (Trace Code, Trace Call, Animate, and Clear Trace), each of which, when selected, provides further program options. Each of the Run menu items are briefly explained below. (Refer to "Debug Window Elements" for further information about specific program commands and operations that appear as part of the Debug window.)

Trace Code

Selecting the Trace Code item provides a line-by-line trace capability while running the Debug program.

Trace Call

Selecting the Trace Call item provides a trace capability of the functions calls while running the Debug program.

Animate

The Animate item allows you to single-step through the various stages of execution. Note that the information is not displayed in real time.

Clear Trace

Selecting the Clear Trace menu item clears the content of the Trace field.

Debug Window Elements

Code List

The content of the Code Memory is disassembled and displayed and any changes made to the memory are immediately reflected here. (Only line-down and page-down scrolling are allowed.) Use the JUMP button to go to an address outside the visible range. Clicking on a code line causes the address of that line to be inserted into the SET BRK, KILL BRK, and JUMP edit boxes.

Break Points

When you click on the SET BRK button, a break point is set at the address shown in the edit box. When you click on the KILL BRK button, the break point at the address shown in the edit box is deleted. The break point list box at the upper left corner of the window shows all the break points set. A click on the CLEAR ALL button deletes all the break points.

Jump/Reset

Click on the JUMP button to set the program counter to the address shown in the edit box. This is also a way to navigate the code listing. The RESET button jumps to the address located at the reset vector location in the code.

Trace Code/Animate

Animation is a mode where the code is continuously “single-stepped” through. A “GO” command will start the single steps and the current location of the PC will be displayed at each step. The trace option only works with Animation. You have the choice of tracing all instructions or tracing only the calls. The traced code is displayed in the Trace Buffer on the right of the window, which shows the last 100 traced entries.

Notes:

1. To execute code in real time, the Animation feature must be disabled. Trace or Animation options can be set from the “Run” menu.
2. Animation is not in real time.

Step/Step Over

Click on the STEP button to do single steps. The number of steps is determined by the number shown in the edit box (maximum of 99 steps). Never process the STEP command through the HALT or STOP instruction in your code, because the communication will be closed after processing the HALT or STOP command. “STEP OVER” only does one step at a time. It is the same as the STEP command except when the current instruction is a “CALL subroutine.” In that case, the subsequent code is executed in real time until the program returns from the subroutine. STEP OVER has the same effect as setting a break point at the instruction immediately following the current one, and executing the GO command.

ICEBOX MENU (Continued)

Go/Halt

You can click on the GO button to start the execution of the DSP program. If the Animation flag is off at this point, the execution is real time. Otherwise, it is simulated by single steps. After a “go,” the program stops when it hits a break point, a STOP or HALT instruction, or when you click on the HALT button. After a “go,” the user should not attempt any other operation except clicking on the HALT button to halt the execution.

Note: If the application inadvertently goes into Stop Mode, the only way to halt the emulator execution is by doing a Stop-Mode Recovery (as defined by the user program). You may also reset the application using the TARGET RESET button.

Line Assembler

From the Code List field in the Debug window, you can change the Code Memory by entering the assembly code directly into the window line by line. After you input a line of assembly code, you can depress the Return key. The assembled code is then written to Code Memory.

Note: Be careful when replacing instructions to avoid corruption of assembly line code that remains.

Symbol Table

The Symbol Table menu item is not active from this part of the program.

Font Size

You can choose from a number of font sizes: Point 6 to Point 12. However, since each system and video type may have its own font set, some font sizes may not be suitable, especially on a VGA display.

Window

The currently opened windows are listed under this menu. You can rearrange the positions of the windows on the screen in different ways by using the commands from this menu.

WINDOW REFRESHING

When you make a change in the Code Memory window, the code view in the Debug window will be updated automatically. When you run a program from the Debug window, all the other windows will **not** be updated automatically. To refresh the window display to reflect the current hardware values, double click the caption bar of each window.

SAVING SESSIONS/RELOADING "SAVED" SESSIONS

You can save a session and reload a “saved” session. Selecting “Save session” saves the information about the position of the opened windows, downloaded code file, and font size used. Not all windows reappear upon reloading of a "Saved" session.

HARDWARE RESET

When you press the emulator RESET button (or power-down, then immediately power-up), the GUI will pick up the signal from the emulator after about 5 seconds. The initial blue screen and the ZILOG logo will be shown while the emulator goes through the initialization sequence.

Note: You may have to move the mouse slightly or press a key in order for the GUI to "pick up" the reset signal.

HELP

The on-line Help program is available to provide brief help messages on various topics. The Help program features an index that easily references the ICEBOX commands and procedures. Topics covered under Help include:

- Index of the Help Program
- Keyboard Commands
- ICEBOX Commands
- Glossary of ICEBOX Program Terms
- Procedure for Using the Emulator
- How to Use Help
- ICEBOX Release Information

CHAPTER 5
TROUBLESHOOTING GUIDE

TROUBLESHOOTING GUIDE

1. Blue Zilog Screen Does Not Appear
Blue Zilog screen not appearing after selecting COM port and screen message displays "Time-out while reading ..."

a. check RS-232 cable connection.
b. check 19200 baud on selected COM port.
c. check if transmit/receive signals need to be swapped.

Note: On some DB9 connectors for the COM ports, the transmit/receive signal may be swapped and an adapter (null modem) may be required.

d. check if power supply can supply required current to the emulator.
e. check if crystal oscillator is seated properly.
f. check if power supply is set at correct voltage.
g. check if power supply is connected and turned on.
h. after resetting emulator, you must wait 5 seconds (minimum) before running the GUI software.

2. V_{CC} Contention. To avoid V_{CC} contention, if a separate V_{CC} is supplied to target, ensure that jumper J1 Pin 1 to Pin 2 is not connected.

3. Oscillator Contention. If the oscillator is used on the target, remove J5_A and install J5_B.

PRECAUTION LIST

1. Download Progress. The GUI code download status is not reflected correctly by the color bar download progress indicator.

2. Breakpoint Overshoot. The Disassembly window shows the processor halting at one or two instructions past the instruction where the breakpoint was set.

3. Downloaded File Name Not Shown except at Time of Download. The emulator only shows the name of the file during the download process. To check the name of the file currently downloded, select "File" and then "Download DSP Memory." The File Name box in the "Download To DSP Code Memory" window will reflect the file that is selected for download. Unlike our other emulators, the Debug window or Memory window does not show the name of the currently downloaded file.

4. Executing GUI. The GUI will occasionally continue to indicate executing after it has been told to halt. Pushing the GO button will then result in executing. (Executing showing at the top of the screen).

5. The emulator cannot be operated while performing ESD testing on the target board.

APPENDIX A
HOW TO RECEIVE ZILOG SAMPLE FILES

HOW TO RECEIVE ZILOG SAMPLE FILES

You may obtain a sample file named "Sample1.ZIP" that contains sample code file. This file can be used in Chapter 3: Emulator Sample Session of this manual. and is obtained by accessing the Zilog Bulletin Board Service (ZBBS) and downloading the named file.

The ZBBS can be reached by calling 408-370-8024. (You must use 2400 Baud Locked.) After entering the ZBBS, perform the following steps to download the Zilog files. (The ZBBS is menu-driven and user-friendly.)

Procedure to Receive Zilog Sample File

1. Type "F" at the MainMenu prompt to go to the "File System" section. (New Users must first answer a brief "New Users Questionnaire".)
2. Type "A" at the FileMenu prompt, which will result in a listing of available directories.
3. Type "9" to go to the DSP files and press RETURN.
4. Type "L" (for a list of available files); press RETURN.
5. Type "D" (to download files).
6. Type "Sample1.ZIP" at the "Enter FileName" prompt; press RETURN.
7. Enter your Modem Protocol at the prompt (enter "?" for a listing, if necessary).
8. Once the desired file is received, type "G" for Good-bye or download another file by repeating steps 5 through 8.