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Z86C36

ICEBOX

User Manual

UM002202-1001

**Z86C36
ICEBOX**



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Preface

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. Therefore, we have designed this manual to be used either as a how-to procedural manual or a reference guide to important data.

The following conventions have been adopted to provide clarity and ease of use:

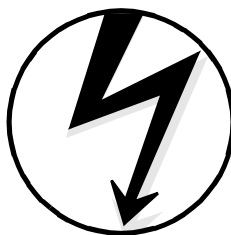
- Times 10-point all-caps is used to highlight the following items:
 - commands, displayed messages
 - menu selections, pop-up lists, button, fields, or dialog boxes
 - modes
 - pins and ports
 - program or application name
 - instructions, registers, signals and subroutines
 - an action performed by the software
 - icons
- Courier Regular 10-point is used to highlight the following items
 - bit
 - software code
 - file names and paths
 - hexadecimal value



- Grouping of Actions Within a Procedure Step

Actions in a procedure step are all performed on the same window or dialog box. Actions performed on different windows or dialog boxes appear in separate steps.

Electrical



Safeguards

Follow the precautions listed below to avoid permanent damage to the emulator.

1. Always use a grounding strap to prevent damage resulting from electrostatic discharge (ESD).
2. Power-Up Precautions.
 - a. Ensure that all power to the emulator and the target application (if any) is turned OFF.
 - b. Connect the target pod to the target application (if any).
 - c. Power up the emulator, then press the RESET button.
 - d. Power up the target application (if any).
3. Power-Down Precautions.

When powering down, follow this procedure in the precise order shown below:

- a. Halt emulation.
- b. In ZDS select Reset from the Build or Debug Menu.
- c. Power down the target application board (if any).
- d. Remove the target pod.
- e. Power down the emulator.



► **Notes:**

1. Refer to the “Precaution List” section of the Product Information sheet for additional operating precautions specific to various devices.
2. Do not leave the emulator powered up with the RS-232C cable connected to a powered-down PC.
3. Before inserting target pod into target application board, refer to Chapter 2 to determine appropriate jumper selections and options.

1 Introduction

OVERVIEW

Congratulations for selecting a fine development tool! The Z86C36 ICEBOX provides in-circuit emulation for the Z8 family of UART controllers. The ICEBOX consists of an emulation daughter board that is plugged into a 32-MHz motherboard using P1 and P2 headers. The Z86C50 ICE chip is used as the emulation processor for devices with less than or equal to 32K of code memory. The Z86C51 ICE chip is used as the emulation processor for devices with 64K of code memory, that is, Z86C36 and Z86C46.

The 32 MHz motherboard has been modified for 64 K operation and provides host communication interface, control processor, I/O space decoding, and LED indicator. The ICEBOXes are designed to be used with ZiLOG Developers Studio, giving the user a total package to write, edit, and debug their applications.

ICEBOX FEATURES

Key features of the Z86C36 ICEBOX include:

- Supports up to 64 K of ROM
- The capability to vary the operating voltage from 3.0–5.0 V
- Supports in-circuit emulation on target systems that operate from 3.0–5.5 V
- The user can choose to power the Ice chip from either the ICEBOX or target board
- Supports UART devices that operate up to 16.384 MHz



- Emulates and supports all the features and functions for a specified Z8 UART microcontroller
- Multitasking allows the user to use other Windows applications while ZiLOG Developer Studio (ZDS) is running

Supported ZiLOG Devices

Table 1 shows products supported by the Z86C5020GSE ICE chip.
Table 2 shows the products supported by the Z86C5120GSE ICE chip.

Table 1. Z86C5020GSE ICE Chip Supported Products (Z86C3500ZEM Target Emulator Selection)

Packages	Emulation	OTP	Required Accessories
28 PDIP	Z86C34–C35	N/A	28 PDIP emulation pod
28 SOIC	Z86C34–C35	N/A	28 PDIP emulation pod and a DIP to SOIC conversion adapter from Emulation Technology (AS-DIP-6-028-S003-1 or AS-DIP-6-028-S003-2)
28 PLCC	Z86C34–C35	N/A	28 PLCC emulation pod
40 PDIP	Z86C44–C45	N/A	40 PDIP emulation pod
44 PLCC	Z86C44–C45	N/A	44 PLCC emulation pod
44 QFP	N/A	N/A	N/A

Table 2. Z86C5120GSE ICE Chip Supported Products (Z86C3600ZEM Target Emulator Selection)

Packages	Emulation	OTP	Required Accessories
28 PDIP	Z86C36	N/A	28 PDIP emulation pod



Table 2. Z86C5120GSE ICE Chip Supported Products (Z86C3600ZEM Target Emulator Selection) (Continued)

Packages	Emulation	OTP	Required Accessories
28 SOIC	Z86C36	N/A	28 PDIP emulation pod and a DIP to SOIC conversion adapter from Emulation Technology (AS-DIP-6-028-S003-1 or AS-DIP-6-028-S003-2)
28 PLCC	Z86C36	N/A	28 PLCC emulation pod
40 PDIP	Z86C46	N/A	40 PDIP emulation pod
44 PLCC	Z86C46	N/A	44 PLCC emulation pod

- **Notes:** The Z86C3600ZEM becomes the Z86C3500ZEM when you use a Z86C50 ICE chip.



HARDWARE SPECIFICATIONS

Operating Conditions

Operating Humidity:	10%-90% RH (Noncondensing)
Operating Temperature:	20 °C ±10 °C
Clocks:	The control processor operates at 7.3728 Mhz; the emulation processor operates at 16.384 Mhz
Serial Baud Rate:	57,600 bps

Power Requirements

This ICEBOX requires an external 5VDC power supply.

Operating Voltage (Input):	+4.75 VDC to +5.25 VDC Max (+5.0 VDC typical)
Operating Voltage (Target):	+3.0 VDC to +5.5 VDC Max
Operating Current:	2.5 A typical (maximum 3.0 A)

Serial Interface

ZiLOG Developer Studio communicates with the Z86C36 ICEBOX using a DB25, RS-232 and DCE cable (TxD, RxD only).

GUI-SUPPORTED COMPILER, ASSEMBLER FORMATS

The ICEBOX supports object (binary or Intel hex) code files produced by ZiLOG Developer Studio (ZDS) and ZiLOG Macro Cross Assembler (ZMASM).

KIT CONTENTS

The ICEBOX kit contains one of each of the following items:

- Z86C36 ICEBOX
- 40 PDIP emulation pod with cable ZiLOG: 93C0024-001
- 44 PLCC emulation pod ZiLOG PC: 99C0273-001
- 28 PDIP emulation pod ZiLOG PC: 99C0742-001
- 28 PLCC emulation pod ZiLOG PC: 99C0512-001
- Power Cable with Banana Plugs
- RS-232 Serial Cable, DB 25
- ZiLOG Developer Studio Installation CD
- Z86C36 ICEBOX User Manual
- ZiLOG Developer Studio manual contained on the ZDS installation CD-ROM.

► **Note:** If the ZDS CD-ROM does not contain the manual, it can be downloaded from the ZiLOG web page at www.zilog.com.

Additional Items Not Supplied

The following item is required but are not currently supplied in the ICEBOX kit:

- A source of power (+5 VDC typical) for the ICEBOX. This can be a laboratory power supply with current rating of at least 2.5 ampere.



Optional Recommended Item

The following items are recommended:

- Your target design. The target design is a wire-wrapped or printed circuit prototype that includes a socket for the target device that the ICEBOX cable/pod plugs into.
- C-Compiler

► **Note:** Contact a ZiLOG Sales Office or Distributor to order a copy of the Z8 C-Compiler. Refer to our website for a representative near you: <http://www.zilog.com/sales/>.

- Oscilloscope
- Logic Analyzer

COMPUTER REQUIREMENTS

Minimum Requirements

- IBM PC (or 100-percent compatible) Pentium based machine
- 75 MHz or more with 16 MB RAM
- VGA Video Adapter
- Hard Disk Drive (12 MB free space)
- CD-ROM Drive (a CD-ROM drive is not needed if you download ZDS from the web at www.zilog.com)
- RS-232 COM Port
- Mouse or Pointing Device
- Microsoft Windows 95/98/NT

The following enhancements to the minimum requirements are recommended:

- 166-MHz IBM PC
- SVGA video adapter
- Printer

CONTACTING ZILOG CUSTOMER SUPPORT

ZILOG has a worldwide customer support center located in Austin, Texas. The customer support center is open from 7 a.m. to 7 p.m. Central Time.

The customer support toll-free number for the United States and Canada is 1-877-ZiLOGCS (1-877-945-6427). For calls outside of the United States and Canada dial 512-306-4067. The FAX number to the customer support center is 512-306-4072. Customers can also contact the support center through our website at <http://www.zilog.com/support/>.

For valuable information about hardware and software development tools, go to ZiLOG home page at <http://www.zilog.com>. The latest released version of the ZDS can be downloaded from this site.



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2 Setup and Installation

HARDWARE INSTALLATION

Before installing the hardware, refer to Figure 1 for a diagram on connecting the ICEBOX to a PC and power supply. Figure 2 provides option jumper locations.

Quick Installation Instructions

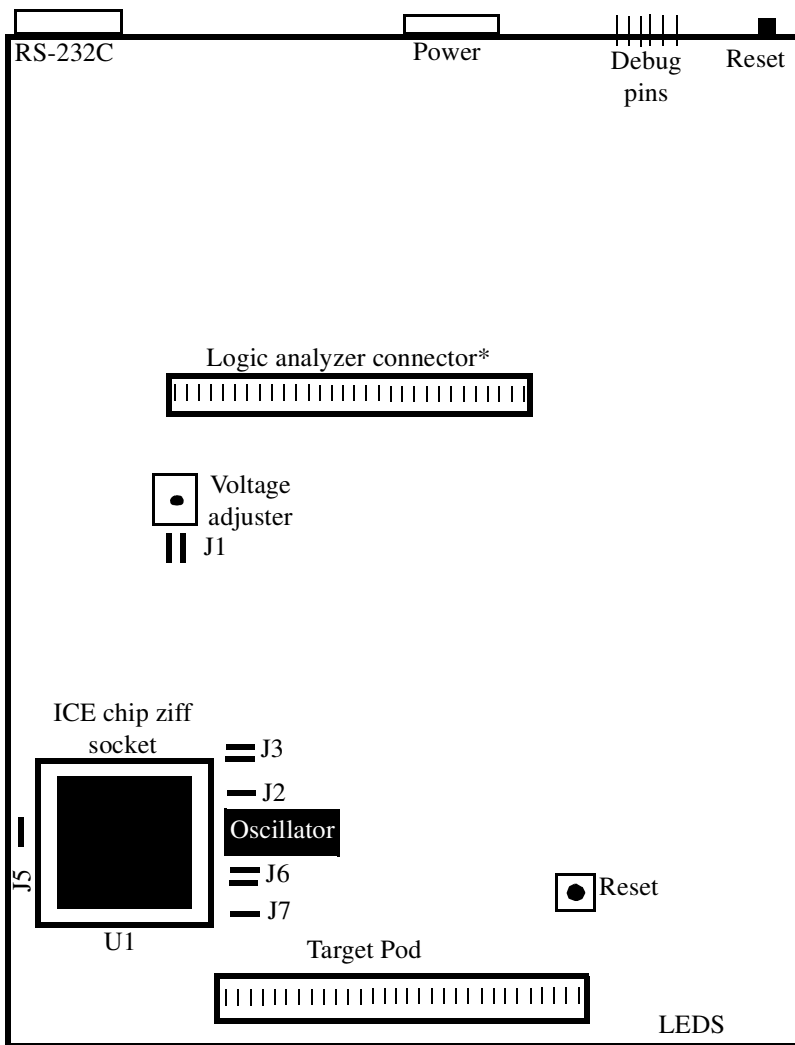
To install the hardware using a bench power supply, perform the following.

1. Set the correct jumper setting for powering the ICE chip and target board. See Set Power Jumper on page 12.
2. Connect the power supply to the emulator and ensure it is set to provide + 5.0 V and 2.5 A.
3. Connect the serial cable to the PC.
4. Connect the ICEBOX to the target board (if performing in-circuit emulation).
5. Set up the oscillator and option jumpers.
6. Select the ICE chip that you want to emulate.
7. Power up the ICEBOX.



Figure 1. Hook-Up Diagram

- ▶ **Note:** Each ICEBOX is shipped with a 16.384 MHz oscillator. The user can also use the target's oscillator or a crystal/ ceramic resonator to clock the ICE chip, for more information see Jumper Settings on page 20.



*This is not supported.

Figure 2. Z86C36 ICEBOX External Top View



Complete Installation Instructions

The following procedures illustrate a complete step-by-step guide on installing the ICEBOX.

Set Power Jumper

The Z86C36 ICEBOXes allow the user to power the ICEBOXes and target from a variety of different sources. Before powering the ICEBOX the user should select the power configuration.



Caution: The procedures below must be followed exactly as described. Before beginning the procedures study Figure 3, which shows a schematic of the J1 power jumper. Failure to follow the procedures will result in total damage to the ICEBOX or target.

Choose from one of the following options when selecting the power source:

- Jumper pin 1 to pin 2 to power the ICE chip with the ICEBOX's adjustable regulator
- Jumper pin 3 to pin 4 to power target with the ICEBOX's adjustable regulator
- Jumper pin 1 to pin 2 and pin 3 to pin 4 to power both the ICE chip and target from the ICEBOX's adjustable regulator
- Jumper pin 2 to pin 4 to power the ICE chip from the target



Note: When powering the target from the ICEBOX ensure that the target's power supply is disconnected.

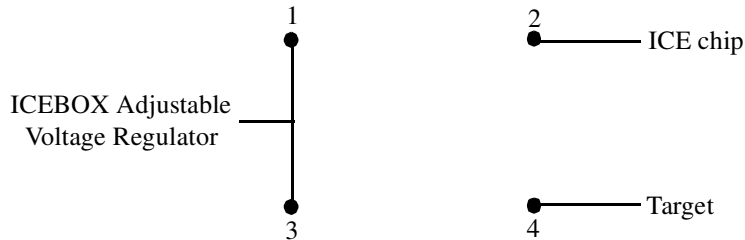


Figure 3. J1 Jumper Schematic

Connect the Power Supply

1. If the power supply allows voltage adjustment:
 - Turn the power supply on and adjust it to +5 V
 - Adjust the limiting adjustment, if present, to at least 2.5 A
2. Turn the supply off.
3. Locate the power cable (red wire, black wire, and banana plugs on the other end). Plug in the black banana plug into the black jack on the power supply (labeled COM, GND, or with the ground symbol). Plug the red plug into the red jack on the power supply (labeled +, + V or +5 V).
4. Plug the white connector on the other end of the cable into the matching 4-pin connector on the back side of the ICEBOX. This connection is keyed to ensure against an improper connection.

► **Note:** The ZiLOG Power Supply Accessory Kit (ZPS05V00ZAC), which is sold separately, provides a fixed-5 V Universal Output Power Supply, accepts 110 V to 220 V AC input, and includes a power cable and an in-line jack cable.



Caution: Always check the supply voltage before plugging in the power cord.