ZiLOG

Z8611600ZEM
ICEBOX™ FAMILY Z8®
IN-CIRCUIT EMULATOR −116

HARDWARE FEATURES

■ Supported Devices:

Package	Emulation	Programming	Notes
18-Pin DIP	Z86116	N/A	
18-Pin SOIC	Z86116*	N/A	[1]*

■ Real-Time Emulation

■ ICEBOX Emulator Provides In-Circuit Program Debug Emulation

■ Z8 Graphical User Interface (GUI) Emulator Software

■ Windows-Based User Interface

■ RS-232C Connector

■ ICE Pod Connector for Emulation

■ HP-16500 Logic Analysis System Interface Connector

*Notes:
[1] With optional, separately purchased adapter available from:

Emulation Technology, Inc.
Telephone (408) 982-0660
FAX (408) 982-0664
Part # AS-DIP.3-020-S003-1

GENERAL DESCRIPTION

The 116 Emulator (Z8611600ZEM) is a member of Zilog's ICEBOX product family of in-circuit emulators providing support for those Z8 microcontroller devices listed in the preceding section.

Zilog's in-circuit emulators are interactive, Windows-based development tools, providing a real-time environment for emulation and debugging.

The emulator provides essential timing and I/O circuitry to simplify user emulation of the prototype hardware and software product.

Data entering and program debugging are performed by the monitor ROM and the host package, which communicates through RS-232C serial interface. The user program can be downloaded directly from the host computer through the RS-232C connector. User code may be executed through debugging commands in the monitor.

The Z8611600ZEM emulator can be connected to a serial port (COM1, COM2, COM3, and COM4) of the host computer and uses Graphical User Interface (GUI) software.

SPECIFICATIONS

Operating Conditions
Operating Temperature: 20°C, ±10°C
Supply Voltage: +5.0 VDC, ± 5%
Minimum Emulation Speed: 200 kHz
Maximum Emulation Speed: 12 MHz

Power Requirements
+5.0 VDC @ 1.0A

Dimensions
Width:	6.25 in.	(15.8 cm)
Length:	9.5 in.	(24.1 cm)
Height:	2.5 in.	(6.35 cm)

Serial Interface
RS-232C @ 9600, 19200 (default), 28800, or 57600 Baud

HOST COMPUTER

Minimum Requirements

IBM PC (or 100-percent compatible) 386-based machine
33 MHz
4 MB RAM
VGA Video Adapter
Hard Disk Drive (1 MB free space)
3.5-inch, High-Density (HD) Floppy Disk Drive
RS-232C COM port
Mouse or Pointing Device
Microsoft Windows 3.1

The following changes to the Minimum Requirements are recommended for increased performance:

486- or Pentium-based machine
66 MHz (or faster)
8 MB of RAM (or more)
SVGA Video Adapter
Color Monitor
Printer

KIT CONTENTS

Z86116 Emulator

• Emulation Base Board includes:
  CMOS
  8K x 8 EPROM (Programmed with Debug Monitor)
  32K x 8 Static RAM
  Three 64K x 4 Static RAM
  RS-232C Interface
  Reset Switch

• Z86116 Emulation Daughterboard
  20 MHz CMOS Z86C5020GSE ICE Chip
  28-Pin DIP Zero Insertion Force (ZIF)
    PN Data EPROM Socket
  40-Pin Target Connector
  100-Pin HP-16500 Logic Analyzer Interface
    Connector
  Reset Switch

Cables/Pods

Power Cable with Banana Plugs
DB25 RS-232C Cable
18-Pin DIP Target Pod

Host Software

Z8® GUI Emulator Software
ZASM Cross-Assembler/MOBJ Object File Utilities

Documentation

Z86116 ICEBOX User's Manual
Z8 Cross-Assembler User's Guide
Universal Object File Utilities (MOBJ) User's Guide
Registration Card
Product Information

LIMITATIONS

1. Changing drives in file download and load symbol dialog boxes is not anticipated by the GUI. Typing in the filename in a directory other than shown in "Path:" will result in "File not found". Changing the drive using the mouse is the workaround.

2. The initial blue Zilog screen will be distorted by other active windows. This only affects the appearance, not functionality, of the GUI.

3. Switching ICEBOXes without quitting the GUI is not supported.

4. The maximum symbols that can be loaded is 32768, provided that there is enough system resource (memory).

5. The ICEBOX breakpoint hardware does not distinguish between instruction and data fetches. When a breakpoint in the GUI is set, the breakpoint hardware triggers when the addresses match for either code or data fetches.

Example:

```
000C    SRP    #%0
000E    LD     R4, #%0016
0010    LD     R5, @R4
0012    NOP
0013    JP     %000C
0016    NOP
```

Setting the breakpoint at %0016 and click GO.

Result: The code will break and stop at %0012.

Note: This will not happen when Animate Mode is on because the GUI is not using the hardware breakpoints when in Animate Mode.

LIMITATIONS (Continued)

6. If the emulator is running a user code at full speed and the port window is opened: Switching to another application or minimizing the GUI (then restoring) will result in the following ICEBOX Communications Error message: "Emulator rejected command: target program is executing." This message may need to be cleared several times (as many as seven) before the GUI returns to normal operation.

   Workaround: Always close the port window before leaving the GUI.

7. Clicking on the HALT button does not always halt the ICEBOX execution. If the application goes into Stop Mode or Halt Mode, the only way to halt the emulator execution is by doing a Stop-Mode or Halt-Mode Recovery (as defined by the user program). You may also reset the application using the RESET button; however, this will reset the whole ICEBOX.

8. Single-stepping into the Halt instruction will cause an ICEBOX "Fatal Error" message to be displayed on the screen. The Ice Chip must be reset, either by /Reset Pin on the target board or by resetting the whole ICEBOX by pressing the RESET button at back of emulator.

9. Do not put breakpoint at address after Stop instruction. This will cause program counter to continue at that location after a Stop-Mode Recovery.

10. The Emulator does not operate at 32 kHz frequency. The low-power 32 kHz oscillator cannot be selected in Emulation Mode; however, it can be selected in Stand-Alone Mode.

11. The ICEBOX does not support any OTP programming.

12. RC oscillator emulation is not supported.

13. The emulator uses the C50 ICE Chip; therefore, port 1 cannot be configured to Low EMI mode. (Bit 4 in PCON registers must be set to logic "1".)
    Note: This condition is not present with the actual emulated device.

PRECAUTION LIST

All Devices

1. The GUI comes up as "C50" in the window caption and uses Z8EM_C50.BSC as the firmware.

2. GUI software versions prior to 3.00 are incompatible with hardware containing BOOTROM 3.00. The GUI software may still boot, but will fail at some later point of the session.

3. When device serialization is enabled in the OTP dialog, the GUI copies the current serial number to code memory immediately before performing a VERIFY operation. If this behavior is undesirable, then device serialization must be disabled prior to invoking the VERIFY operation.

4. The status color bar in OTP dialog box will be cleared in the area where a new window opens on top of it.

5. For 386 PCs, set the baud rate to 19.2K or less because Windows' communication driver does not guarantee "reliable" operation at more than 9600 baud. Selecting a high baud rate on some slower 386 machines may crash the Windows environment.

6. Do not press hardware reset when the ICEBOX is in OTP programming. If reset is pressed while the GUI is doing OTP programming, close the OTP dialog window and reopen it to reload the information back to the hardware.

   Note: Although the Command Status shows "Processing" after the GUI reestablishes the communication link when Retry was selected, the ICEBOX is actually sitting idle.)

PRECAUTION LIST (Continued)

7. All Z8® control registers are write only unless stated otherwise.

8. Power Supply ramp-up/rise time must be such that when minimum Power-On Reset (POR) time (T_{POR}) expires, then the V_{CC} must be in the supported specified operating range of the device.

9. Check the T_{POR} and T_{WDT} specifications of the device that you wish to emulate. The actual specification may differ from the ICE chip specifications.

10. The PCON Register reserved bits for the 116 emulator must be set to "1".

11. The general-purpose registers after POR or at initial emulator use will be different than the actual device. The emulator self test will always leave the same values in the general-purpose registers, while the real device will have a random/undefined value in the general-purpose registers.

12. The register %F8 (PO1M register) bits D4 and D3 must be set to state "0" and bit D2 must be set to state "1".

13. Watch-Dog Timer (WDT) running in Stop Mode is not supported.

14. For emulation of the Z86116, select "Z86C06/E06" from the Z8 Microcontroller List Box in the Configuration Dialog Box.

15. The Emulator cannot be operated while performing ESD/EMI testing on the target board.

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Zilog, Inc. 210 East Hacienda Ave.
Campbell, CA 95008-6600
Telephone (408) 370-8000
Telex 910-338-7621
FAX 408 370-8056
Internet: http://www.zilog.com