Z86C36

ICEBOX

User Manual

UM002202-1001

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Preface

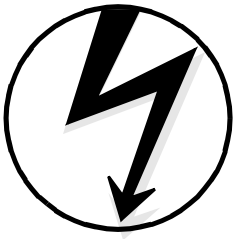
We recommend that you read and understand everything in this manual before setting up and using the product. However, we recognize that users have different styles of learning. Therefore, we have designed this manual to be used either as a how-to procedural manual or a reference guide to important data.

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.

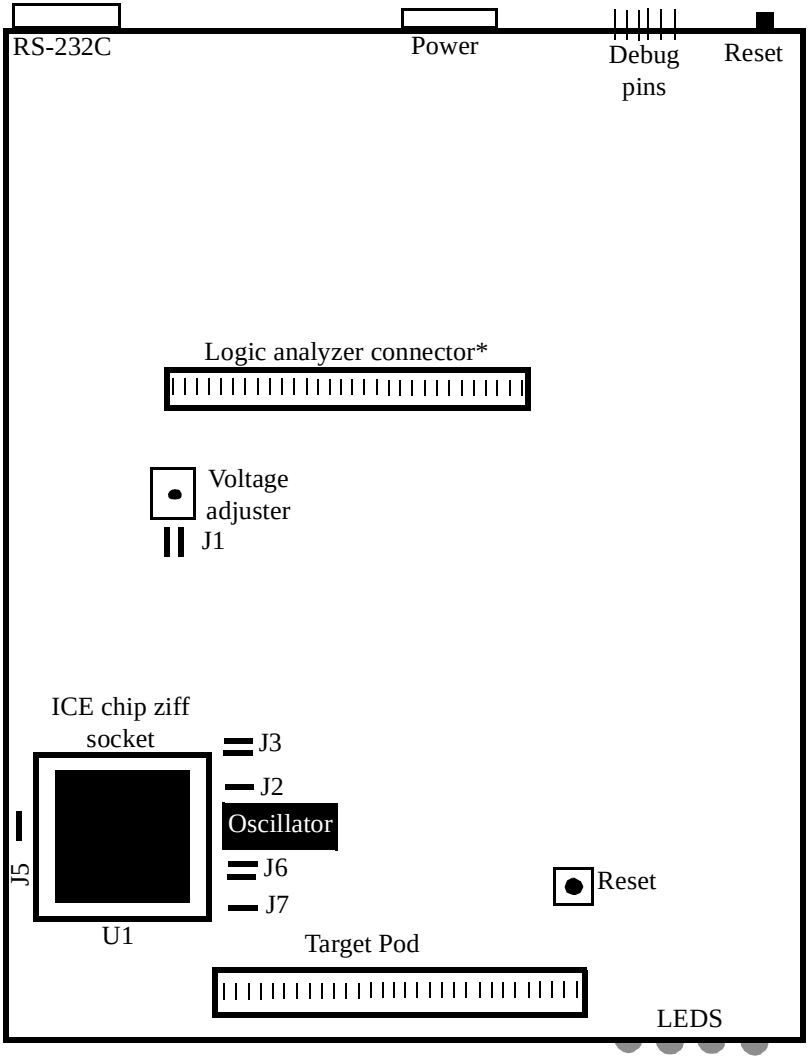
Quick Installation Instructions

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.

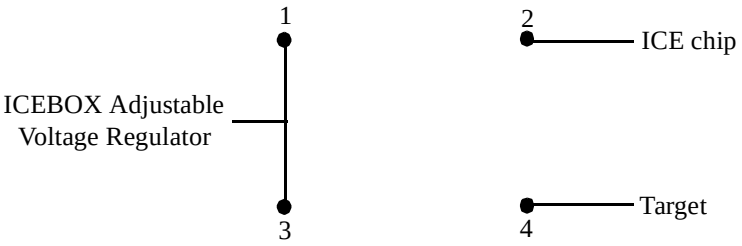


Figure 3. J1 Jumper Schematic

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.

Connect the Serial Cable to the PC

Locate the serial cable. Connect the male end to the female connector on the back of the ICEBOX, and the female end to either the COM1, COM2, COM3, or COM4 connector of the host PC, see Figure 1.

Note: If connector availability is limited to a 9-pin COM1 through COM4, then use either a different cable or a 25-pin to 9-pin converter. This converter is available at any electronics store for a nominal fee.

Connect to the Design

Perform the following steps to connect to the target design:

Caution: Wear a properly grounded wrist strap or similar ESD protection before continuing.

1. Locate the emulation cable for the device.
2. Plug the cable into the target device. Ensure that the pin 1 marking (as indicated by the red mark on the ribbon cable) matches pin 1 on the target board.
3. Plug the other end of the cables into target pod on top of the ICEBOX. See Figure 2 for the location of the target pod.
4. Select the power source for the ICE chip by configuring the J1 jumper. See Table 4 for more information on jumper settings and Figure 2 for the location of the J1 jumper.
5. If the target and ICEBOX are using separate power supplies, ensure that the ICE chip voltage matches the target's device voltage. Adjust the voltage by performing the following steps:
   a. Measure the voltage of your target.
   b. Locate the voltage adjuster on top of the ICEBOX. See Figure 2 for the location of the voltage adjuster

c. Attach the voltmeter lead to either pin 1 or 3 on the J1 jumper and ground.

d. Power the ICEBOX with the target device disconnected.

e. Turn the voltage adjuster's screw until the voltmeter's read-out matches the target device's voltage.

Caution: Failure to match the target devices voltage with the ICE chip's voltage could result in damage to the ICEBOX, target device, or ICE chip.

Power the ICEBOX

If anything unusual (such as an unexpected sound and/or smell) occurs when turning on the power supply, turn off the power supply and check the setting for the J1 jumper. See Set Power Jumper on page 12. If the power supply allows voltage adjustment, adjust it again to +5 V. The power supply output may measure less than +5 V because of the load of the ICEBOX. If your power supply has a current meter, ensure that the ICEBOX is drawing within the rated current.

After power-up, press the RESET button to reset the ICE chip. (Pressing the RESET button avoids bus contention on the I/O lines.) If the ICEBOX is not powering your design through the V_{CC} pin, turn on the power supply of the design.

Caution: If your design already has a power supply, do not power your design from the ICEBOX V_{CC} pin.

When powering down, follow the procedure described below:

1. Halt emulation.
2. In ZDS select Reset from the Build or Debug Menu.
3. Power down the target application board (if using its own power supply).
4. Power down the ICEBOX.

Note: Refer to the complete Electrical Safeguards shown in the preface of this manual.

Installing a New ICE Chip

The Z86C36 ICEBOX comes with the Z86C51 ICE chip. Under ordinary circumstances, the user should never have to remove this ICE chip. If for some reason the ICE chip needs to be replaced, follow the procedures below. See Figure 4 and Figure 5 for more information.

Note: Replace the Z86C51 ICE chip with the Z86C50 ICE chip to support devices with 32K code size or less.

Caution: Failure to follow the procedures below could result in damage to the ICEBOX.

Perform the following steps to replace the ICE chip.

1. Disconnect all power to the ICEBOX
2. Move the ICEBOX ziff socket labeled U1 to the upright position and remove the ICE chip. See Figure 2 for the location of the ziff socket.
3. Place the new ICE chip into the U1 ziff socket. Ensure that the ICE chip's pin 1 matches pin 1 on the U1 ziff socket.
4. Close the ziff socket locking lever.

Note: A dot in the corner of the processor indicates the chip's pin 1 location.

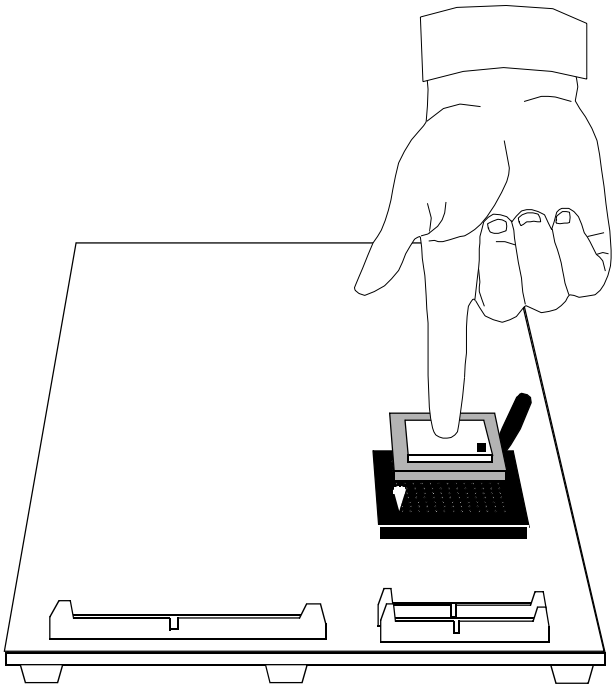


Figure 4. ICE Chip Installation

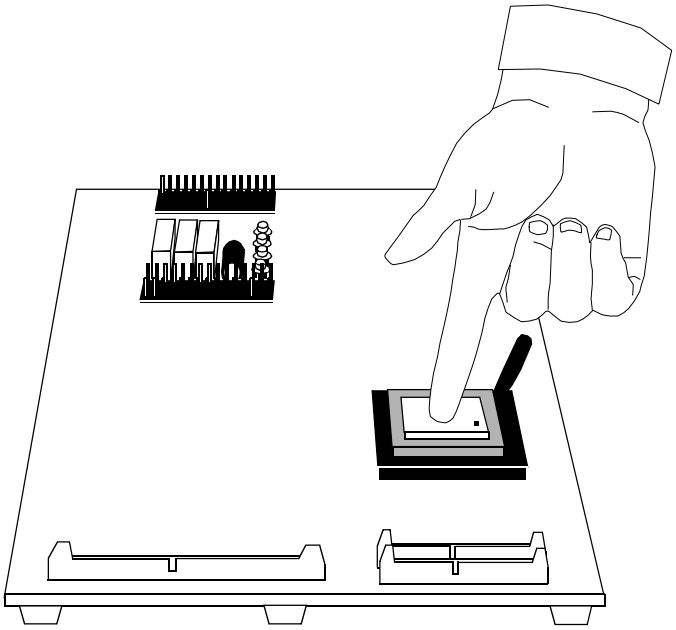


Figure 5. Closing the ICE Chip Locking Lever

SOFTWARE INSTALLATION

For more information on installing ZDS, refer to the user manual that is included on the installation CD-ROM or download ZDS literature from the ZiLOG web page at www.zilog.com.

ICEBOX OPERATION

The following topics guide the user on how to operate the ICEBOX and configure jumper settings.

Resetting

Press the RESET button on the ICEBOX to reset the state of the target device and the status that was established using ZDS.

For example, the ICEBOX sets the program counter to 000Ch.

After reset, wait until the Ready LED is ON and has finished blinking before starting ZDS. Refer to the LED Operation section of this chapter for more details.

Note: Always press the RESET button on the ICEBOX before starting ZDS.

LED Operation

ZiLOG ICEBOXes use LEDs to communicate the different hardware states. The following table gives a description of the LEDs. The ICEBOX's LED's are located on the right front of the ICEBOX. See Table 3.

Table 3. Front LED Assignments

LED	Indication	Description
READY	On	Communicating in Bisync Mode and waiting for command
	Off	Communicating in ASCII Mode or executing Bisync command
RUN	On	Running user code
	Off	Not running user code
OTP	On	The ICEBOX is performing OTP programming
	Off	The ICEBOX completed OTP programming
PWR	On	ICEBOX is powered up and Self Test is completed
	Off	Power is off
	Blink	ICEBOX is self-testing

Jumper Settings

Table 4 lists jumper setting that the are easily configured by the user. See Figure 2 for the location of the jumpers.

Table 4. Jumper Settings

Jumper	Pin	Position	Description
J1	1-2	In	Powers the ICE chip with ICEBOX's adjustable voltage regulator (default), for more information see Figure 3
J1	3-4	In	Powers the Target with ICEBOX's adjustable voltage regulator
J1	2-4	In	Target powers the ICE chip
J2	1-2	In	Y2 Crystal to XTAL2
J2	2-3	In	User Crystal to XTAL2
J3	1-2	In	Y2 Crystal to XTAL1
J3	2-3	In	User Crystal to XTAL1
J3	2-4	In	Canned Oscillator to XTAL1 (Default)
J5	1-2	In	Not installed (factory settings)
J6	2-4	In	Enable if P3.4 used for external memory/DM (*see note)*
J6	2-3	In	P3.4 not used (default)
J6	1-2	In	Ground signal
J7	1-2	In	Default setting
J7	2-3	In	Output of PAL (Programable Array Logic)/not used

Note: Port 3 pin 4 can be used as an output pin or an external memory indicator. If P3.4 is used for external memory and not data memory, then jumper pin 2 to pin 4 on the J6 jumper.

The user can adjust the voltage of the ICE chip to match the target's voltage using the ICEBOX's R55 Voltage Adjuster. See Figure 2 for the location of the voltage adjuster.

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3 Overview

USING ZDS

This ICEBOX is fully compatible with ZiLOG Developer Studio (ZDS) software. The following steps briefly describe the procedures necessary to setup and create projects with the Z86C36 ICEBOX. A summary of the ICEBOX's available debug windows is also included at the end of this chapter.

For more detailed information on using ZDS, refer to the ZDS User Manual (in PDF format) located on the installation CD-ROM, or download the latest information from our web site at www.zilog.com.

Select the ICEBOX

Perform the following steps to select the ICEBOX and create a new project:

1. Open ZDS by selecting Start>Programs>Zilog Developer Studio> ZDS.
2. Choose New Project from the File menu. The New Project dialog box appears as show in Figure 6.

Note: If the project has already been created, select Target from the Project menu and perform the following steps that are applicable for the ZiLOG MCU Database dialog box.

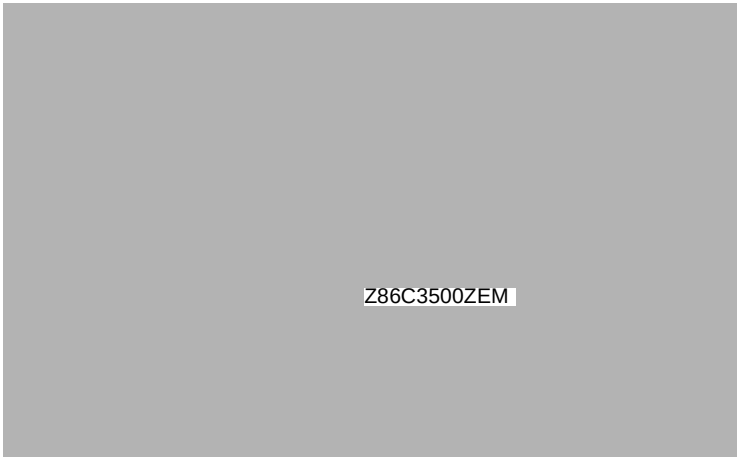

Figure 6. New Project Dialog Box

3. Select `Family` in the Selection by field.
4. Select `Z8` from the Master pop-up list.
5. Select a microcontroller from the Z8 family in the Project Target pop-up list.
6. Select `Z86C3500ZEM` or `Z86C3600ZEM` in the Emulator pop-up list.

Note: The Z86C3600ZEM becomes the Z86C3500ZEM when you use a Z86C50 ICE chip.

7. Click on the browse button (...) in the Project Name field. The New Project Browser dialog box appears.
8. Enter the project file name and select a path in the New Project Browse dialog box.

Note: All build output files, such as linker and assembly files are saved in the same directory as the project.

9. Click Save. The project name appears in the Project Name field in the New Project dialog box.
10. Click on Chip Data to view the microcontroller specifications.

Note: Fields in the Chip Data page are read-only and can not be modified.

11. Click OK. The new project is saved as the name specified in the New Project Browse dialog box.
12. Select Emulator Configuration from the Project menu. The Emulator Configuration dialog box appears, as shown in Figure 7.

Figure 7. Emulator Configuration Dialog Box

13. Ensure that Emulator is selected in the Module field.
14. Select the port the ICEBOX is connected to from the Port pop-up list.
15. Select `57600` from the Baud Rate pop-up list.
16. Click OK to close and apply the Emulator Configuration options.
17. Select Save Project from the File menu to save the emulator configuration setting.

Open a Project and Add Files

A previously created project has the following attributes saved with it:

- Target settings
- Assembler and Linker settings for the specified target
- Source files (including header files)

Note: Use the Project Viewer window to view and access the various files in any given project.

Perform the following steps to open a previously created project:

1. Select Open Project from the File menu. The Open Project dialog box appears.
2. In the Open Project dialog box, select the previously created project. The project appears in the Project Viewer window, as shown in Figure 8.

Figure 8. Project Viewer Window

Add an Existing File

Perform the following steps to add an existing file to a project:

1. Select Add to Project>Files from the Project menu. The Insert Files into Project dialog box appears, as shown in Figure 9.

Figure 9. Insert Files into Project Dialog Box

2. Select the file to add to the project.

3. Click Open. The file appears in the Project Viewer window, as shown in Figure 10.

Figure 10. Project Viewer Window with File

4. Double-click on the file in the Project Viewer window. The file appears in the ZDS main Edit window.

Note: In some cases, non-editable files, such as `.obj` files need to be included in a project. These files are displayed in the source file list, but cannot be opened. When the project is built, these files are automatically linked.

5. Select Update All Dependencies from the Build menu. The Dependencies folder list in the Project Viewer window is updated.

Add a New File

1. Select Add to Project>New from the Project menu. The Insert New Files Into Project dialog box appears.
2. Type a file name in the File Name field.
3. Click Open. The new file name appears in the Project Viewer window with a `.asm` suffix, and a blank Edit window also appears.

Note: Header and Included files do not have to be added. The program detects those called by the source code.

AVAILABLE DEBUG WINDOWS

Table 5 lists the debug windows that are available using ZDS.

Table 5. Debug Windows

Window	Function Updated values display in red
Watch	• Shows the symbols and the contents of the registers (see the ZDS user manual for more information)
Z8 Standard Registers	• Shows the contents of the Z8 standard registers
Code Memory	• Allows the user to monitor, edit, and download a `.ld` file or a `.hex` file into Code Memory from generated assembly source code • Tracks a specific address entered in the Code Address edit box
Disassembly	• Shows code memory along with the corresponding disassembled code • Allows the user to edit, and download a file.ld or file.hex into the Code memory • Follows the program counter • Provides a complete scroll down with this window, however the scroll up is limited • Accesses the disassembly of code at the address specified in the Code Address field • The Disassembly window is automatically displayed when debugging hex code or whenever there is no corresponding source file available at the address specified by the program counter

Table 5. Debug Windows (Continued)

Window	Function Updated values display in red
Z8 Register File	• Shows all Z8 internal and external registers, all RAM pointer and data registers, status registers and status flags, and stacks • Monitor and edit write-able registers in this window
Z8 Expanded Register	• Displays the Z8 Expanded Register banks that are specified in the configuration • Monitor and edit write-able registers directly in this window by selecting a specific bank tab
Working Registers	• Modify and view working registers in this window
Timer Counter Registers	• Modify and view the timer/counter registers in this window
Ports Register	• Monitor and edit port registers in this window

Appendix A: Troubleshooting Guide

INTRODUCTION

Before contacting a ZiLOG representative or submitting a Problem Report, please follow these simple steps. Also, check the Precautions and Limitations sections in the Product Information document included with the emulator to eliminate other possible known problems. If a hardware failure is suspected, contact a local ZiLOG representative for assistance.

ERROR OPENING SERIAL PORT

If the initial ZiLOG screen is not appearing after selecting the COM port and the screen message displays Time-out while reading:

1. Check the RS-232C cable connection and communication port selection in ZDS. See Select the ICEBOX on page 23 for more information on how to configure the host PC's port.
2. Reset the emulator and ZDS.
3. Try connecting another cable.
4. 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 a Null Modem adapter may be required.

5. Ensure that the power supply is connected, is turned on, and power is available.
6. Ensure that the power supply is set at the correct voltage.

7. Ensure that the J1 power jumper has been properly configured. See Set Power Jumper on page 12 for more information on setting the J1 jumper.
8. Check if power supply is supplying the required current (2.5 A typical) to the emulator.
9. Check selected the port using another application or select another COM port.
10. After resetting the emulator, wait a minimum of 5 seconds before running ZDS.

COUNTER JUMPS TO UNEXPECTED ADDRESS

Any instruction other than a `DI` instruction is used to disable interrupts. Possible causes include:

- The stack overflows into the general register locations.
- Extra `POP`, `PUSH`, `IRET`, or `RET` is encountered (stack unbalanced).
- Program resets repeatedly.
  - Program counter rolls over from value FFFF to 0000 and proceeds back to the beginning of program.
  - Watch-Dog Timer (WDT) is not initialized or refreshed.
- Unintialized interrupt vector is activated. The interrupt vector is not set to the interrupt handler.

ZDS ERROR MESSAGES

Can Not Open Windows

If this message appears while attempting to open a window ZDS, there may not be enough memory within the Microsoft Windows environment

to properly run ZDS. Try closing the other active applications or exit and re-enter the Microsoft Windows environment.

Out of Synchronization with the Emulator

This message appears whenever communication between the emulator and the PC is interrupted.

1. Ensure that the power cable is connected.
2. Ensure that the RS-232C cable is connected.
3. Change the baud rate setting (default is `19200`). A lower setting usually improves communications reliability.
4. Reestablish communication between ZDS and the emulator. See the ZDS on-line help for more information on establishing communication with an emulator.

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Appendix B: ASCII Character Set

Table 6. ASCII Character Set

Graphic	Decimal	Hexadecimal	Comments
	0	0	Null
	1	1	Start Of Heading
	2	2	Start Of Text
	3	3	End Of Text
	4	4	End Or Transmission
	5	5	Enquiry
	6	6	Acknowledge
	7	7	Bell
	8	8	Backspace
	9	9	Horizontal Tabulation
	10	A	Line Feed
	11	B	Vertical Tabulation
	12	C	Form Feed
	13	D	Carriage Return
	14	E	Shift Out
	15	F	Shift In
	16	10	Data Link Escape
	17	11	Device Control 1
	18	12	Device Control 2

Table 6. ASCII Character Set (Continued)

Graphic	Decimal	Hexadecimal	Comments
	19	13	Device Control 3
	20	14	Device Control 4
	21	15	Negative Acknowledge
	22	16	Synchronous Idle
	23	17	End Of Block
	24	18	Cancel
	25	19	End Of Medium
	26	1A	Substitute
	27	1B	Escape
	28	1C	File Separator
	29	1D	Group Separator
	30	1E	Record Separator
	31	1F	Unit Separator
	32	20	Space
!	33	21	Exclamation Point
"	34	22	Quotation Mark
#	35	23	Number Sign
$	36	24	Dollar Sign
%	37	25	Percent Sign
&	38	26	Ampersand
’	39	27	Apostrophe
(	40	28	Opening (Left) Parenthesis
)	41	29	Closing (Right) Parenthesis

Table 6. ASCII Character Set (Continued)

Graphic	Decimal	Hexadecimal	Comments
*	42	2A	Asterisk
+	43	2B	Plus
,	44	2C	Comma
-	45	2D	Hyphen (Minus)
.	46	2E	Period
/	47	2F	Slant
0	48	30	Zero
1	49	31	One
2	50	32	Two
3	51	33	Three
4	52	34	Four
5	53	35	Five
6	54	36	Six
7	55	37	Seven
8	56	38	Eight
9	57	39	Nine
:	58	3A	Colon
;	59	3B	Semicolon
<	60	3C	Less Than
=	61	3D	Equals
>	62	3E	Greater Than
?	63	3F	Question Mark
@	64	40	Commercial At

Table 6. ASCII Character Set (Continued)

Graphic	Decimal	Hexadecimal	Comments
A	65	41	Uppercase A
B	66	42	Uppercase B
C	67	43	Uppercase C
D	68	44	Uppercase D
E	69	45	Uppercase E
F	70	46	Uppercase F
G	71	47	Uppercase G
H	72	48	Uppercase H
I	73	49	Uppercase I
J	74	4A	Uppercase J
K	75	4B	Uppercase K
L	76	4C	Uppercase L
M	77	4D	Uppercase M
N	78	4E	Uppercase N
0	79	4F	Uppercase 0
P	80	50	Uppercase P
Q	81	51	Uppercase Q
R	82	52	Uppercase R
S	83	53	Uppercase S
T	84	54	Uppercase T
U	85	55	Uppercase U
V	86	56	Uppercase V
W	87	57	Uppercase W

Table 6. ASCII Character Set (Continued)

Graphic	Decimal	Hexadecimal	Comments
X	88	58	Uppercase X
Y	89	59	Uppercase Y
Z	90	5A	Uppercase Z
[	91	5B	Opening (Left) Bracket
\	92	5C	Reverse Slant
]	93	5D	Closing (Right) Bracket
^	94	5E	Circumflex
_	95	SF	Underscore
‘	96	60	Grave Accent
a	97	61	Lowercase A
b	98	62	Lowercase B
c	99	63	Lowercase C
d	100	64	Lowercase D
e	101	65	Lowercase E
f	102	66	Lowercase F
g	103	67	Lowercase G
h	104	68	Lowercase H
i	105	69	Lowercase I
j	106	6A	Lowercase J
k	107	6B	Lowercase K
1	108	6C	Lowercase L
m	109	6D	Lowercase M
n	110	6E	Lowercase N

Table 6. ASCII Character Set (Continued)

Graphic	Decimal	Hexadecimal	Comments
o	111	6F	Lowercase O
p	112	70	Lowercase P
q	113	71	Lowercase Q
r	114	72	Lowercase R
s	115	73	Lowercase S
t	116	74	Lowercase T
u	117	75	Lowercase U
v	118	76	Lowercase V
w	119	77	Lowercase W
x	120	78	Lowercase X
y	121	79	Lowercase Y
z	122	7A	Lowercase Z
{	123	7B	Opening (Left) Brace
|	124	7C	Vertical Line
}	125	7D	Closing (Right) Brace
~	126	7E	Tilde
	127	7F	Delete

Appendix C: Problem/Suggestion Report Form

If you experience any problems while operating this product, or if you note any inaccuracies while reading the user manual, please copy this form, fill it out, then mail or fax it to ZiLOG. We also welcome your suggestions!

Customer Information

Name		Country	
Company		Telephone	
Address		Fax Number	
City/State/ZIP		E-Mail Address	

Product InformationReturn Information

Serial # or Board Fab #/Rev. #

Software Version

Manual Number

Host Computer Description/Type

ZiLOG, Inc.
System Test/Customer Support
910 E. Hamilton Ave., Suite 110, MS 4-3
Campbell, CA 95008
Fax Number: (408) 558-8536
Email: tools@zilog.com

Problem Description or Suggestion

Provide a complete description of the problem or your suggestion. If you are reporting a specific problem, include all steps leading up to the occurrence of the problem. Attach additional pages as necessary.

_____

_____

_____

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Glossary

ASCII	American Standard Code of Information Interchange.
Baud	Unit of measure of transmission capacity.
Binary	Number system based on 2. A binary digit is a bit.
BISYNC	Bidirectional Synchronous Communication Protocol.
Bit	A digit of a binary system. It has only two possible values: 0 or 1.
BPS	Bits Per Second. Number of binary digits transmitted every second during a data-transfer procedure.
Bus	In Electronics, a parallel interconnection of the internal units of a system that enables data transfer and control Information.
Byte	A collection of four sequential bits of memory. Two sequential bytes (8 bits) comprise one word.
COM	Device name used to designate a communication port.
DIP	Dual In-line Package. The plastic housing designed to be attached directly to a circuit board or equipment case.

Emulation	Process of duplicating the behavior of one product or part using another medium.
Emulator	An emulation device. For example, an In-Circuit Emulator (ICE) module duplicates the behavior of the chip it emulates in the circuit being tested.
GUI	Graphical User Interface. The windows and text that a user sees on their computer screen when they are using a program.
ICE	In-Circuit Emulator. A ZiLOG product which supports the application design process.
Icon	A small screen image representing a specific element like a document, embedded and linked objects, or a collection of programs gathered together in a group.
Initialize	To establish start-up parameters, typically involving clearing all of some part of the device's memory space.
Instruction	Command.
I/O	Input/Output. In computers, the part of the system that deals with interfacing to external devices for input or output, such as keyboards or printers.
MCU	Microcontroller or Microcomputer Unit.
OTP	One-Time Programmable.
PC	Personal computer, program counter.

POP	Retrieve a Value from the Stack.
Port	The point at which a communications circuit terminates at a Network, Serial, or Parallel Interface card.
PUSH	Store a Value In the Stack.
RA	Relative Address.
RAM	Random-Access Memory. A memory that can be written to or read at random. The device is usually volatile, which means the data is lost without power.
RS-232C	Electronic Industries Association Standard for Asynchronous Transmissions Between a Computer and a Peripheral Device.
SOIC	Small Outline IC.
SVGA	Super Video Graphics Adapter.
TMR	Timer Mode Register.
UART	Universal Asynchronous Receiver Transmitter. Component or functional block that handles asynchronous communications. Converts the data from the parallel format in which it is stored, to the serial format for transmission.
V	Volt, Overflow Flag.
V_{CC}	Supply Voltage.

WDT	Watch-Dog Timer. A timer that, when enabled under normal operating conditions, must be reset within the time period set within the application (WDTMR (1,0)). If the timer is not reset, a Power-on Reset occurs. Some earlier manuals refer to this timer as the WDTMR.
Word	Amount of data a processor can hold in its registers and process at one time. A DSP word is often 16 bits. Given the same clock rate, a 16-bit controller processes four bytes in the same time it takes an 8-bit controller to process two.
XTAL	Crystal.
Z8	ZiLOG Chip.
ZDS	ZiLOG Developer Studio. ZiLOG's program development environment for Windows 95/98/NT.
Z	locatable object modules for the ZiLOG family of microcontrollers.
ZMASM	ZiLOG Macro Cross Assembler. ZiLOG's program development environment for Windows 3.1.

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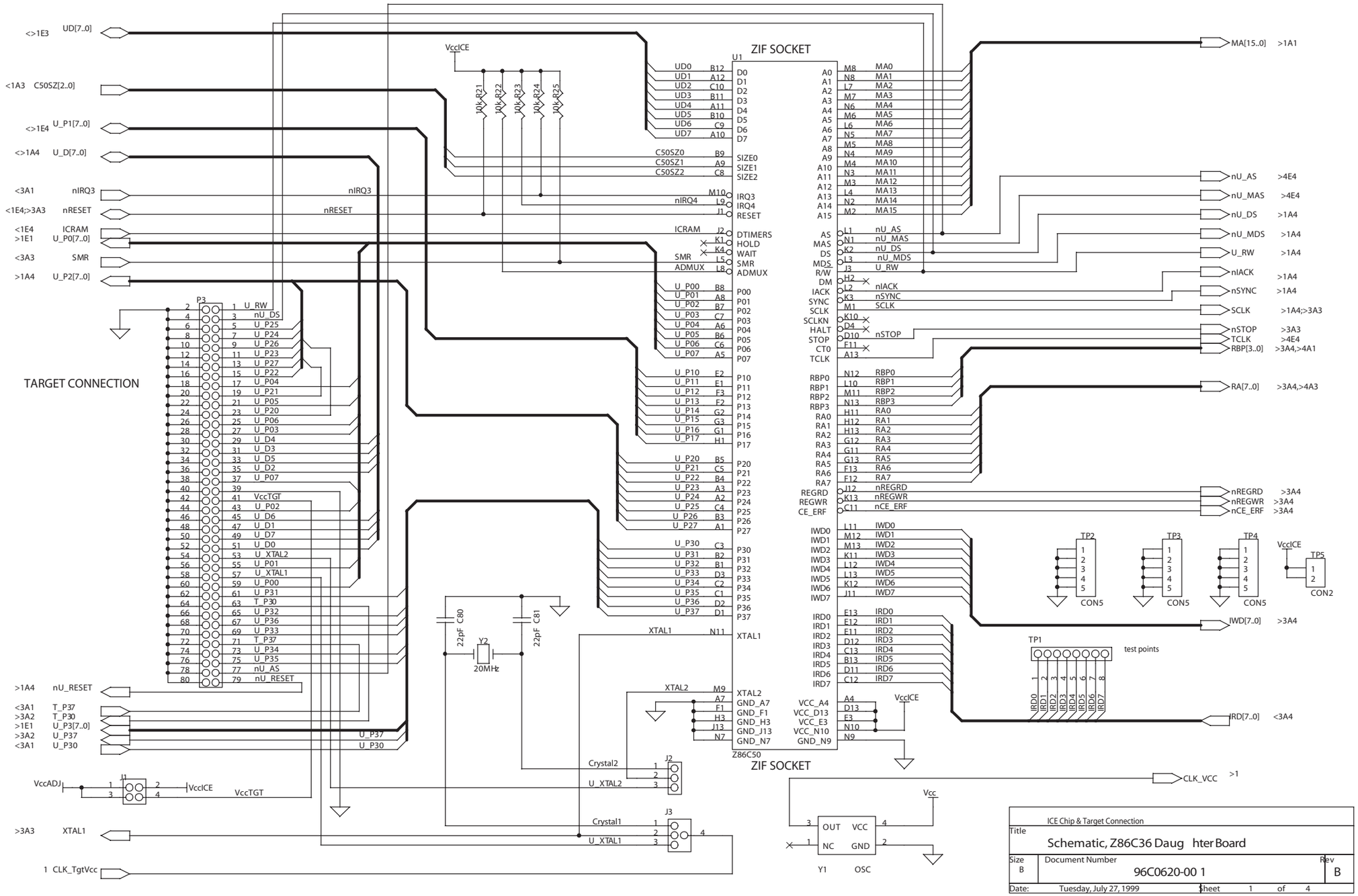
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Z86C50
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10k-R25
22pF C80
22pF C81
Y2
20MHz
Crystal2
Crystal1
J1
J2
J3
VccADJ
VccICE
VccTGT
Y1
OSC
OUT
VCC
NC
GND
Vcc
TP1
test points
TP2
TP3
TP4
TP5
CON5
CON2
MA[15..0] >1A1
nU_AS >4E4
nU_MAS >4E4
nU_DS >1A4
nU_MDS >1A4
U_RW >1A4
nIACK >1A4
nSYNC >1A4
SCLK >1A4;>3A3
nSTOP >3A3
TCLK >4E4
RBP[3..0] >3A4,>4A1
RA[7..0] >3A4,>4A3
nREGRD >3A4
nREGWR >3A4
nCE_ERF >3A4
IWD[7..0] >3A4
IRD[7..0] <3A4
CLK_VCC >1
ICE Chip & Target Connection
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Document Number
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Rev
B
Date: Tuesday, July 27, 1999
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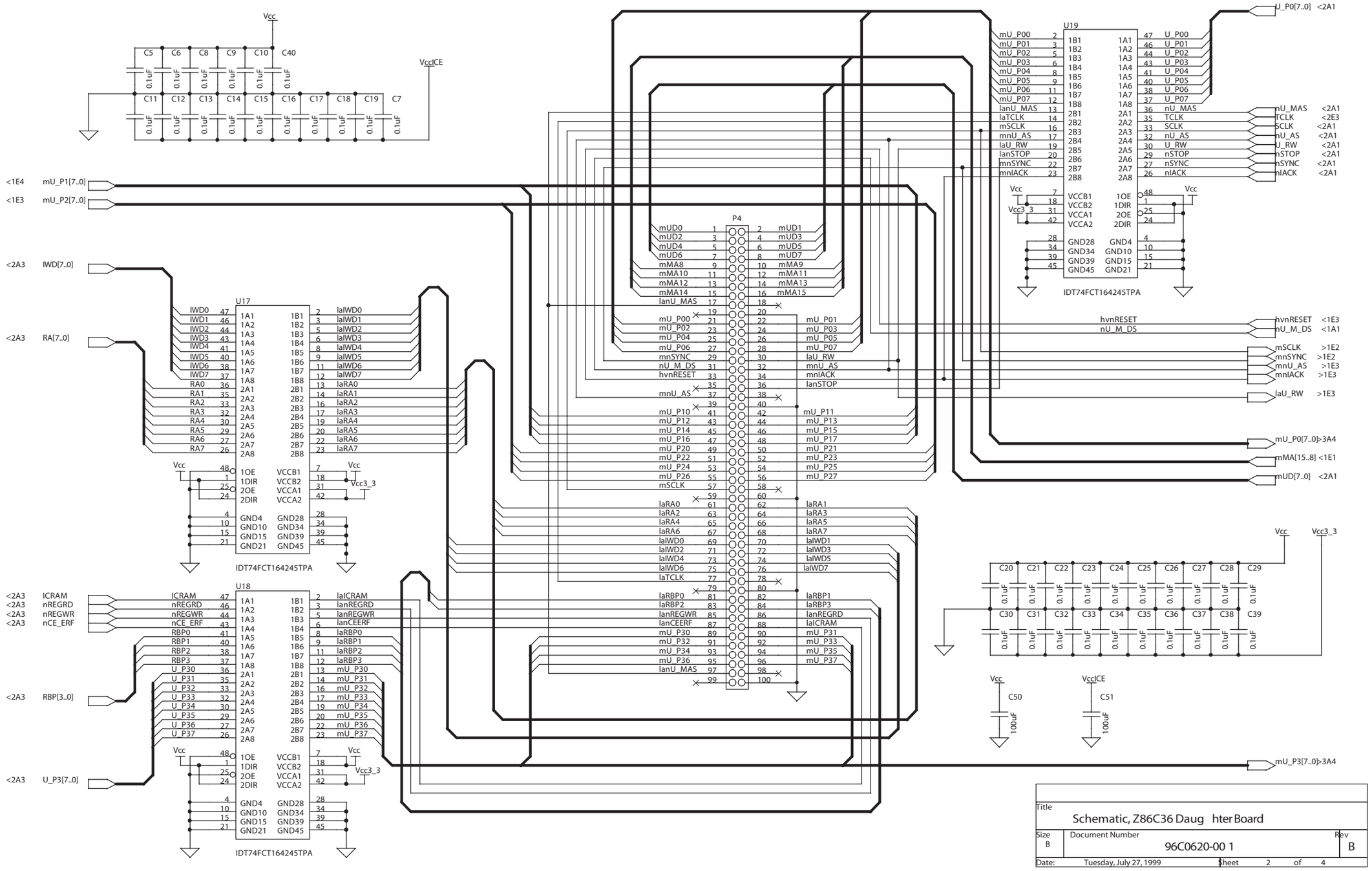
Vcc
VcclCE
C5 C6 C8 C9 C10 C40
C11 C12 C13 C14 C15 C16 C17 C18 C19 C7
0.1uF
<1E4 mU_P1[7..0]
<1E3 mU_P2[7..0]
<2A3 IWD[7..0]
<2A3 RA[7..0]
U17
IWD0 IWD1 IWD2 IWD3 IWD4 IWD5 IWD6 IWD7
RA0 RA1 RA2 RA3 RA4 RA5 RA6 RA7
laIWD0 laIWD1 laIWD2 laIWD3 laIWD4 laIWD5 laIWD6 laIWD7
laRA0 laRA1 laRA2 laRA3 laRA4 laRA5 laRA6 laRA7
1OE 1DIR 2OE 2DIR
VCCB1 VCCB2 VCCA1 VCCA2
GND4 GND10 GND15 GND21
GND28 GND34 GND39 GND45
Vcc3_3
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U18
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<2A3 nREGRD
<2A3 nREGWR
<2A3 nCE_ERF
<2A3 RBP[3..0]
<2A3 U_P3[7..0]
ICRAM nREGRD nREGWR nCE_ERF
RBP0 RBP1 RBP2 RBP3
U_P30 U_P31 U_P32 U_P33 U_P34 U_P35 U_P36 U_P37
laICRAM lanREGRD lanREGWR lanCEERF
laRBP0 laRBP1 laRBP2 laRBP3
mU_P30 mU_P31 mU_P32 mU_P33 mU_P34 mU_P35 mU_P36 mU_P37
IDT74FCT164245TPA
P4
mUD0 mUD1 mUD2 mUD3 mUD4 mUD5 mUD6 mUD7
mMA8 mMA9 mMA10 mMA11 mMA12 mMA13 mMA14 mMA15
lanU_MAS
mU_P00 mU_P01 mU_P02 mU_P03 mU_P04 mU_P05 mU_P06 mU_P07
mnSYNC
nU_M_DS
hvnRESET
laU_RW
mnU_AS
mnIACK
lanSTOP
mU_P10 mU_P11 mU_P12 mU_P13 mU_P14 mU_P15 mU_P16 mU_P17 mU_P20 mU_P21 mU_P22 mU_P23 mU_P24 mU_P25 mU_P26 mU_P27
mSCLK
laRA0 laRA1 laRA2 laRA3 laRA4 laRA5 laRA6 laRA7
laIWD0 laIWD1 laIWD2 laIWD3 laIWD4 laIWD5 laIWD6 laIWD7
laTCLK
laRBP0 laRBP1 laRBP2 laRBP3
lanREGWR lanREGRD
lanCEERF lalCRAM
mU_P30 mU_P31 mU_P32 mU_P33 mU_P34 mU_P35 mU_P36 mU_P37
U19
mU_P00 mU_P01 mU_P02 mU_P03 mU_P04 mU_P05 mU_P06 mU_P07
lanU_MAS laTCLK mSCLK mnU_AS laU_RW lanSTOP mnSYNC mnIACK
U_P00 U_P01 U_P02 U_P03 U_P04 U_P05 U_P06 U_P07
nU_MAS TCLK SCLK nU_AS U_RW nSTOP nSYNC nIACK
VCCB1 VCCB2 VCCA1 VCCA2
1OE 1DIR 2OE 2DIR
GND28 GND34 GND39 GND45
GND4 GND10 GND15 GND21
IDT74FCT164245TPA
U_P0[7..0] <2A1
nU_MAS <2A1
TCLK <2E3
SCLK <2A1
nU_AS <2A1
U_RW <2A1
nSTOP <2A1
nSYNC <2A1
nIACK <2A1
hvnRESET <1E3
nU_M_DS <1A1
mSCLK >1E2
mnSYNC >1E2
mnU_AS >1E3
mnIACK >1E3
laU_RW >1E3
mU_P0[7..0]>3A4
mMA[15..8] <1E1
mUD[7..0] <2A1
mU_P3[7..0]>3A4
C20 C21 C22 C23 C24 C25 C26 C27 C28 C29
C30 C31 C32 C33 C34 C35 C36 C37 C38 C39
C50 C51
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Rev B
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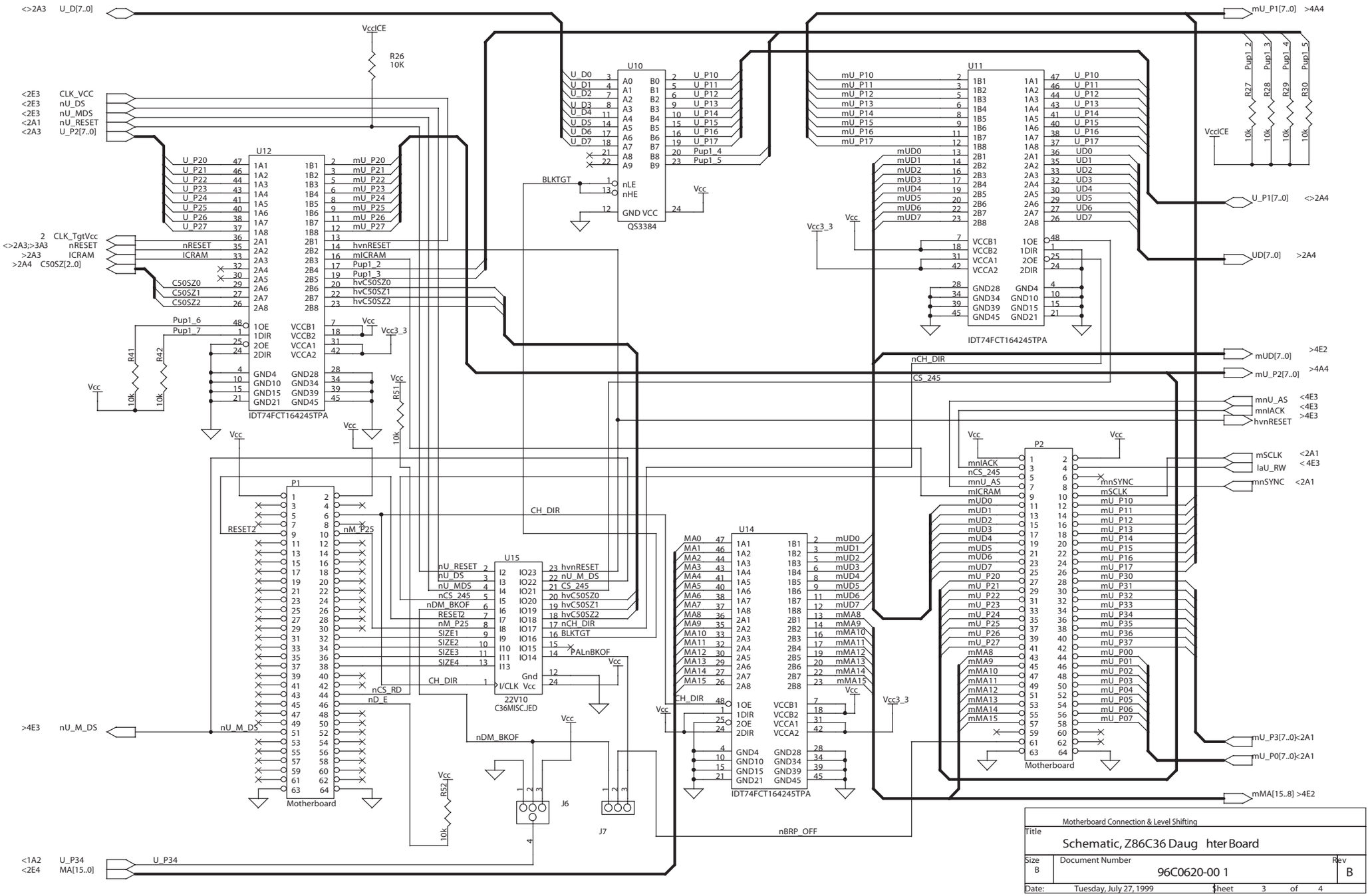

U_D[7..0]
VccICE
R26
10K
CLK_VCC
nU_DS
nU_MDS
nU_RESET
U_P2[7..0]
U12
IDT74FCT164245TPA
CLK_TgtVcc
nRESET
ICRAM
C50SZ[2..0]
U10
QS3384
BLKTGT
U11
IDT74FCT164245TPA
mU_P1[7..0]
U_P1[7..0]
UD[7..0]
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mU_P2[7..0]
nCH_DIR
CS_245
mnU_AS
mnIACK
hvnRESET
mSCLK
laU_RW
mnSYNC
P2
Motherboard
P1
Motherboard
U15
22V10
C36MISC.JED
CH_DIR
nM_P25
nU_M_DS
nCS_RD
nD_E
nDM_BKOF
PALnBKOF
U14
IDT74FCT164245TPA
J6
J7
nBRP_OFF
U_P34
MA[15..0]
mU_P3[7..0]
mU_P0[7..0]
mMA[15..8]
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Rev
B
Date: Tuesday, July 27, 1999
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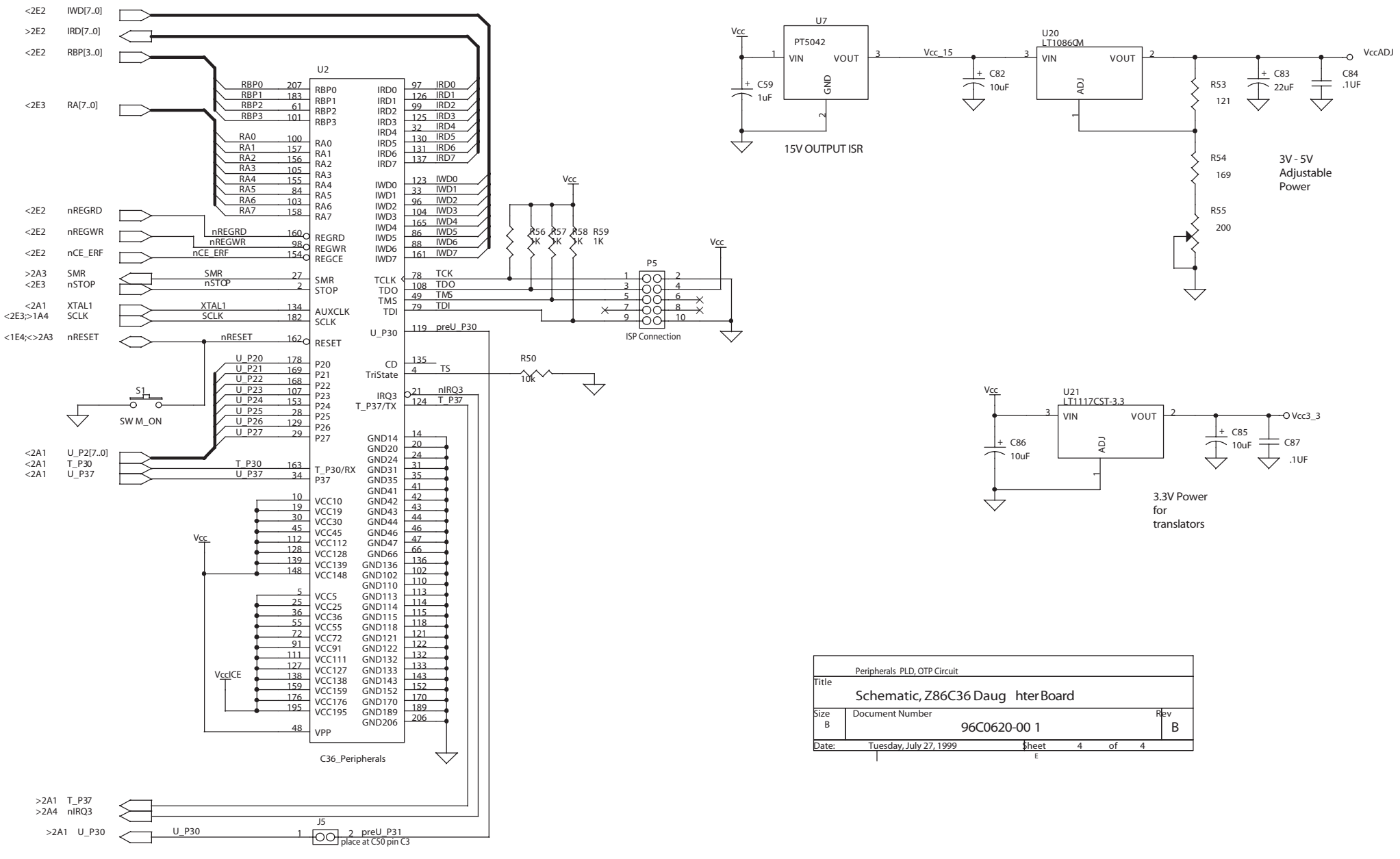
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C36_Peripherals
U7
PT5042
15V OUTPUT ISR
U20
LT1086CM
3V - 5V
Adjustable
Power
U21
LT1117CST-3.3
3.3V Power
for
translators
P5
ISP Connection
S1
SW M_ON
J5
place at C50 pin C3
Peripherals PLD, OTP Circuit
Schematic, Z86C36 Daug hter Board
96C0620-00 1
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