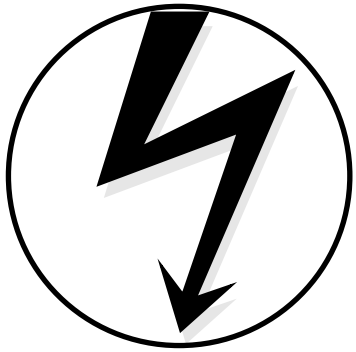
Z9036900 Emulator
User Manual

Electrical  Safeguards

WARNING!

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

I. Always use a grounding strap to prevent damage resulting from electrostatic discharge (ESD).

II. Power-Up Precautions.

1. Ensure that all power to the emulator and the target application (if any) is turned OFF.
2. Connect the target pod to the target application (if any).
3. Power up the emulator, then press the RESET button.
4. Power up the target application (if any).

III Power-Down Precautions.

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

1. Power down the target application board (if any).
2. Remove the target pod.
3. 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.

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PREFACE

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. 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:

- Universe Medium 10-point all-caps is used to highlight to 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.

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CHAPTER 1 INTRODUCTION

OVERVIEW

Congratulations for selecting a fine development tool! The Z9036900ZEM emulator is ZiLOG's in-circuit emulator providing emulation for the Z8930X, Z8933X, Z9034X, Z9035X and Z9036X family of TV controllers. The emulator is also capable of OTP programming for the family being emulated. The emulator is designed to be used with Zilog Developers Studio, giving the user a total package to debug, write and edit your applications.

EMULATOR FEATURES

Key features of the Z9036900ZEM emulator include:

- Supports all existing features of the original Z9035900ZEM and Z8930900ZEM emulators
- Provides OTP programming support for the Z9034X, Z9035X and Z9036X products as well as improved programming of Z893X products
- Editing program memory, DSP RAM, register files
- Tracking memory locations tracked and setting breakpoints ROM
- Single stepping into codes
- Viewing of multiple windows and the contents of program memory, register files, and DSP RAM can be edited
- Operating multiple emulators at the same time
- Multitasking other Windows applications while Zilog Developer Studio (ZDS) is running

SUPPORTED ZILOG DEVICES

Table 1-1 shows the products supported by the Z9036900ZEM Emulator:

TABLE 1-1. SUPPORTED PRODUCTS

Packages	Emulation	OTP	Required accessories
40 PDIP	Z89300	N/A	40pin Dip Emulation Pod (PC ASSY#99C0395-001)
42 SDIP	Z89331/2	Z89331	42pin Dip Emulation Pod (PC ASSY#99C0394-001) 42pin Dip OTP Adapter (PC ASSY#99C0615-001)
42 SDIP	Z89361/5	Z89361	42pin Dip OTP Adapter (PC ASSY#99C0615-001)
52 SDIP	Z89301/2	N/A	52pin Dip Emulation Pod (PC ASSY#99C0393-001)
52 SDIP	Z90341/5/6/7/8	Z89341	52pin Dip Emulation Pod (PC ASSY#99C0393-001) 52pin Dip OTP Adapter (PC ASSY#99C0616-001)
52 SDIP	Z90351/5/6/7/8	Z89351	52pin Dip Emulation Pod (PC ASSY#99C0393-001) 52pin Dip OTP Adapter (PC ASSY#99C0616-001)

HARDWARE SPECIFICATIONS

OPERATING CONDITIONS

Operating Humidity: 10%-90% RH (Non condensing)

Operating Temperature: 20°C ±10°C

Clocks: The control processor operates at 3.6864 Mhz, the emulation processor operates at 32Khz to 12 Mhz

Serial Baud Rate: 57,600 bps

POWER REQUIREMENTS

This emulator requires an external 5VDC power supply.

Operating Voltage (Input): +4.75 VDC to +5.25 VDC Max (+5.0 VDC typical)

Operating Voltage (Target): +4.75 VDC to +5.25 VDC Max (+5.0 VDC typical)

Operating Current: 2.5A typical

SERIAL INTERFACE

Zilog Developer Studio communicates with the Z9036900Z Emulator using a DB25, RS-232 DCE cable (TxD, RxD only).

GUI-SUPPORTED COMPILER, ASSEMBLER FORMATS

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

KIT CONTENTS

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

- Z9036900ZEM Emulator Board
- Z9035912GSE ICE Chip (installed on board)
- Z8930912GSE ICE Chip (installed on board)
- Power Cable with Banana Plugs
- RS-232 Serial Cable, 9-pin M-F
- 60-Pin Target Cable
- 40PDIP Emulation Pod (PC ASSY#99C0395-001)
- 42PDIP Emulation Pod (PC ASSY#99C0394-001)
- 52PDIP Emulation Pod (PC ASSY#99C0393-001)
- 42PDIP OTP Adapter (PC ASSY#99C0615-001)
- 52PDIP OTP Adapter (PC ASSY#99C0616-001)
- CD-ROM containing Zilog Developer Studio
- Z9036900ZEM Users Manual
- 1999 Technical Library CD-ROM
- ZiLOG Developer Studio manual contained on the ZDS installation CD-ROM.

NOTE: If the ZDS CD-ROM doesn't contain the manual it can be downloaded from the ZiLOG web page at www.zilog.com.

ADDITIONAL ITEMS NOT SUPPLIED

The following items are required but are not currently supplied in the emulator kit:

- A source of power (+5VDC typical) for the emulator. This can be a laboratory power supply with current rating of at least 1.5 ampere.
- Your target design, typically this is a wire-wrapped or printed circuit prototype that includes a socket for the target device which the emulator cable/pod plugs into.

OPTIONAL RECOMMENDED ITEM

The following items are recommended:

- Oscilloscope
- Logic Analyzer
- C-Compiler

NOTE: When this manual was released ZDS did not have a C compiler. Until ZDS's C compiler is completed the user should use Production Languages Corp. (PLC) 3xx IDE tool to compile programs in C. Contact ZiLOG customer service to see if the ZDS C compiler has been completed.)

COMPUTER REQUIREMENTS

MINIMUM REQUIREMENTS

IBM PC (or 100-percent compatible) 486-Based Machine

33 MHz

4-MB RAM

VGA Video Adapter

Hard Disk Drive (3.0 MB free space)

3.5-inch, High-Density (HD) Floppy Disk Drive

RS-232 COM Port

Mouse or Pointing Device

Microsoft Windows 3.1

CONTACTING ZILOG CUSTOMER SUPPORT

ZILOG has a worldwide customer support center located in Austin, Texas that is open from 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 E-mail the support center at csupport@zilog.com

For valuable information about hardware and software development tools go to the. 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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CHAPTER 2
SET-UP AND INSTALLATION

HARDWARE INSTALLATION

Before installing the hardware, refer to Figure 2-1 for a diagram on connecting the emulator to your PC and power supply; Figure 2-4 provides option jumper locations.

QUICK INSTALLATION INSTRUCTIONS

To install the hardware utilizing a 5VDC wall-adaptor power supply, perform the following:

1. Turn on the power supply and ensure that it is set to + 5.0V and 1.5A.
2. Connect the serial cable to the PC.
3. Connect the emulator to the target board (if performing in circuit emulation)
4. Set up the oscillator and option jumpers.
5. Select the ICE chip that you wish to emulate.
6. Plug a 5.0 VDC, 1.5 Amp Wall Power Adaptor to the power connector on the Z9036900.
7. Power up the Z9036900.

COMPLETE INSTALLATION INSTRUCTIONS

Follow the below procedures for a complete guide on installing the emulator.

Connect the Power Supply

WARNING!

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

1. If the power supply allows voltage adjustment:
   - Turn the power supply on and adjust it to +5V
   - Adjust the setting for at least 2.5A, if there is a current-limiting adjustment
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 +5V).
4. Plug the white connector on the other end of the cable into the matching 4-pin connector on the back side of the emulator. (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-5V Universal Output Power Supply, accepts 110V to 220V AC input, and includes a power cable and an in-line jack cable.

Connect the Serial Cable to the PC

Locate the serial cable. Connect the male end to the female connector on the back of the ICE-BOX, and the female end to either the COM1, COM2, COM3, or COM4 connector of the host PC.

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. (Available at any electronic store for a nominal price.)

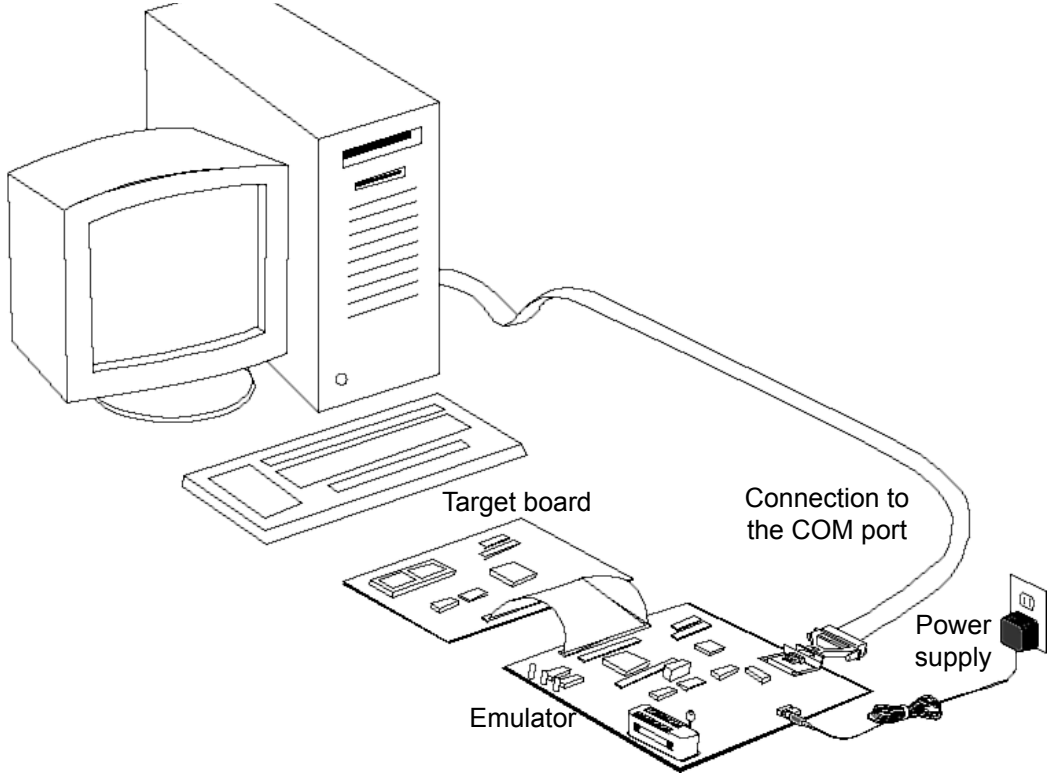

FIGURE 2-1. HOOK-UP DIAGRAM

NOTE: Each emulator is shipped with a 20.480MHz oscillator. For other rates, remove the oscillators and install different ones that are within the frequency specifications of the device in use. ZiLOG does not guarantee operation with oscillators other than the supplied model.

Connect to the Design

To connect to the target design perform the following steps:

1. Locate the emulation cable for the device.

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

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 emulator. See Figure 2-4 for the location of the target pod.

Connect Logic Analyzer (Optional)

The logic analyzer can either be connected as part of the initial setup, or later as the user continues working with their design.

To connect to a logic analyzer perform the following steps:

1. Locate the cable for the logic analyzer.

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

2. Plug the logic analyzer into the a ZiLOG logic analyzer adapter (not included with the Z9036900 Emulator kit).

NOTE: The logic analyzer adapter can be ordered from customer service by requesting part number 98C0289-001.

3. Plug the cable from the ZiLOG logic analyzer adapter into the emulator. Ensure that the pin 1 marking (as indicated by the red mark on the ribbon cable) matches the pin 1 on the target board. See Figure 2-4 for the location of the logic analyzer connector.

Choosing the IceChip

The Z9036900 emulator comes with two removable ICE chips, the Z9035912GSE and the Z8930912GSE. These two chips allow the user to emulate Z8930X, Z8933X, Z9036X, Z9034X and the Z9035X families of Zillog micro controller.

WARNING!

Failure to follow the below procedures could result in damage to the emulator.

To configure the Z9036900 emulator for Z8930X, Z8933X, Z8936X family of processors perform the following steps.

1. Disconnect all power to the emulator
2. Move the Alternate Ice Chip zif socket locking lever to the upright position and remove the Z8930912GSE ICE chip.
3. Locate the emulator zif socket labeled U4 . See Figure 2-4 for the location of the zif sockets.
4. Place the Z8930912GSE ICE chip into the U4 zif socket. Ensure that the ICE chip's pin 1 matches pin 1 on the U4 zif socket.

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

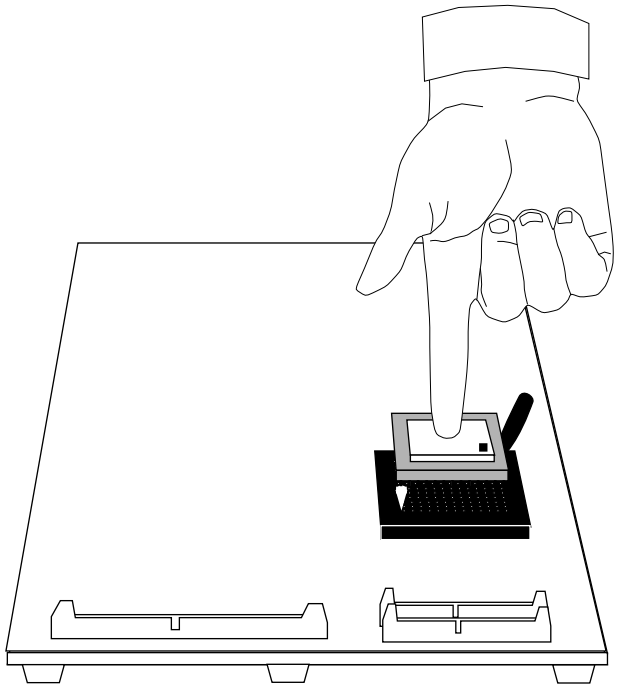

FIGURE 2-2. ICE CHIP INSTALLATION

5. Close the zif socket locking lever.

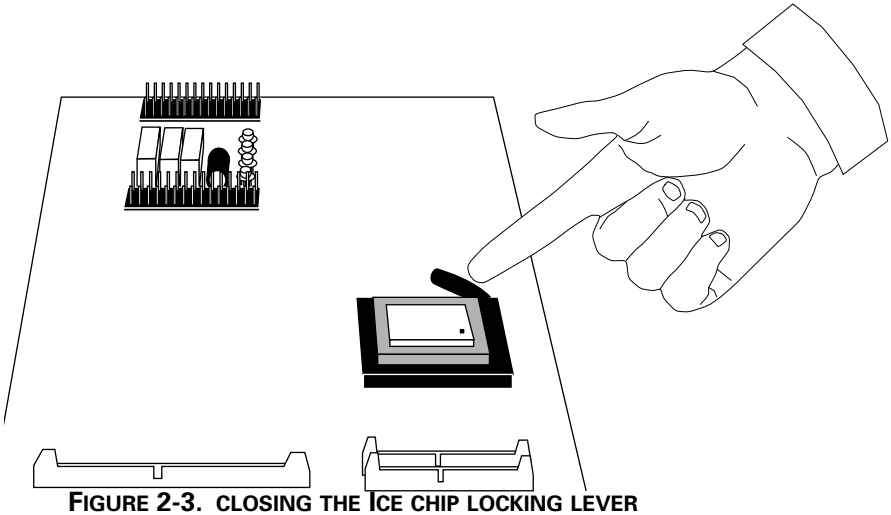

FIGURE 2-3. CLOSING THE ICE CHIP LOCKING LEVER

6. Remove the Z9035912GSE ICE chip from the U8 zif socket and place it in the Alternate Ice Chip zif socket.

To configure the Z9036900 emulator for the Z9034X and Z90935X family of processors perform the following steps.

1. Disconnect all power to the emulator
2. Move the Alternate Ice Chip zif socket locking lever to the upright position and remove the Z9035912GSE ICE chip.
3. Locate the emulator zif socket labeled U8. See Figure 2-4 for the location of the zif sockets.
4. Place the Z9035912GSE ICE chip into the U8 zif socket. When placing ensure that the ICE chip's pin 1 matches pin 1 on the U8 zif socket.
5. Close the U4 zif socket locking lever.
6. Remove the Z8930912GSE ICE chip from the U4 zif socket and place it in the Alternate Ice Chip zif socket.

Power the Emulator

If anything unusual (such as an unexpected sound or smell) occurs when turning on the power supply, quickly turn off the power supply and check your connections. If the power supply allows voltage adjustment, adjust it again to +5V. (It may be somewhat lower than +5V because of the load of the emulator.) If the power supply has a current meter, ensure that the emulator 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 emulator is not powering your design through the V_{CC} pin, turn on the power supply of the design.

WARNING!

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

When powering down perform the following procedures:

1. Power down the target application board (if using its own power supply).
2. Power down the emulator.

NOTE: Refer to the complete Electrical Safeguards shown on the first page of this manual.

SOFTWARE INSTALLATION

For more information on installing ZDS refer to the user manual PDFs that are included on the install program or download the ZDS literature from the ZiLOG web page at zilog.com.

EMULATOR OPERATION

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

RESETTING

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

For example, it sets the emulator to %000C.

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

WARNING!

Always press the RESET button on the emulator before starting ZDS.

LED OPERATION

ZiLOG emulators use LEDs to communicate the different hardware states. The following table gives a description of the LEDs. The Z9036900 LED's are located on the right side of the emulator.

TABLE 2-1. FRONT LED ASSIGNMENTS

LED	Indication	Description
READY	On Off	Communicating in Bisync Mode and waiting for command Communicating in ASCII Mode or executing Bisync command
RUN	On Off	Running user code or self testing when first turned on Not running user code
OTP	On Off	The Emulator is performing OTP programing
PWR	On Off	Emulator is powered Power is off

JUMPER SETTINGS

The following table lists jumper setting that the are easily configured by the user. See Figure 2-4 for the location of the jumpers.

TABLE 2-2. JUMPER SETTINGS

Jumper	Pin	Position	Description
J1	1or2	In	Connect the trace external trigger to pin 1 or 2.
J2	1-2	In	Selects EPC2 EPROM
J2	2-3	In	Select EPC1441 EPROM (default)
J3	N/A	In	Emulator supplies power to target board
J3	N/A	Out	Emulator power is isolated from the target board
J4	1-2	In	Target system HSYNC is connected to series schmitt-trigger
J4	2-3	In	Target system HSYNC is connected to the emulation processors' HSYNC
J6	1-2	In	The watch dog timer stops at the breakpoint (default)
J6	2-3	In	The watch dog timer is controlled by the emulator
J7	1-2	In	No internal ROM (default)
J7	2-3	In	Internal ROM is selected
J8	1-2	In	Program address bus of emulation processor is tri-stated
J8	2-3	In	Program address bus is controlled by the emulator (default)
J9	1-2	In	Select this jumper if the target system or the emulator provide positive polarity HSYNC
J9	2-3	In	Select this jumper if the target system or the emulator provide negative polarity HSYNC
J10	1-2	In	Composite AD0 input connected to filter on the emulator (install J11)
J10	2-3	In	Composite AD0 input connected directly to the emulation processor
J15	1-2	In	The updated firmware from ZDS is downloaded into the default boot sector
J15	2-3	In	The updated firmware from ZDS is downloaded into the alternate boot sector

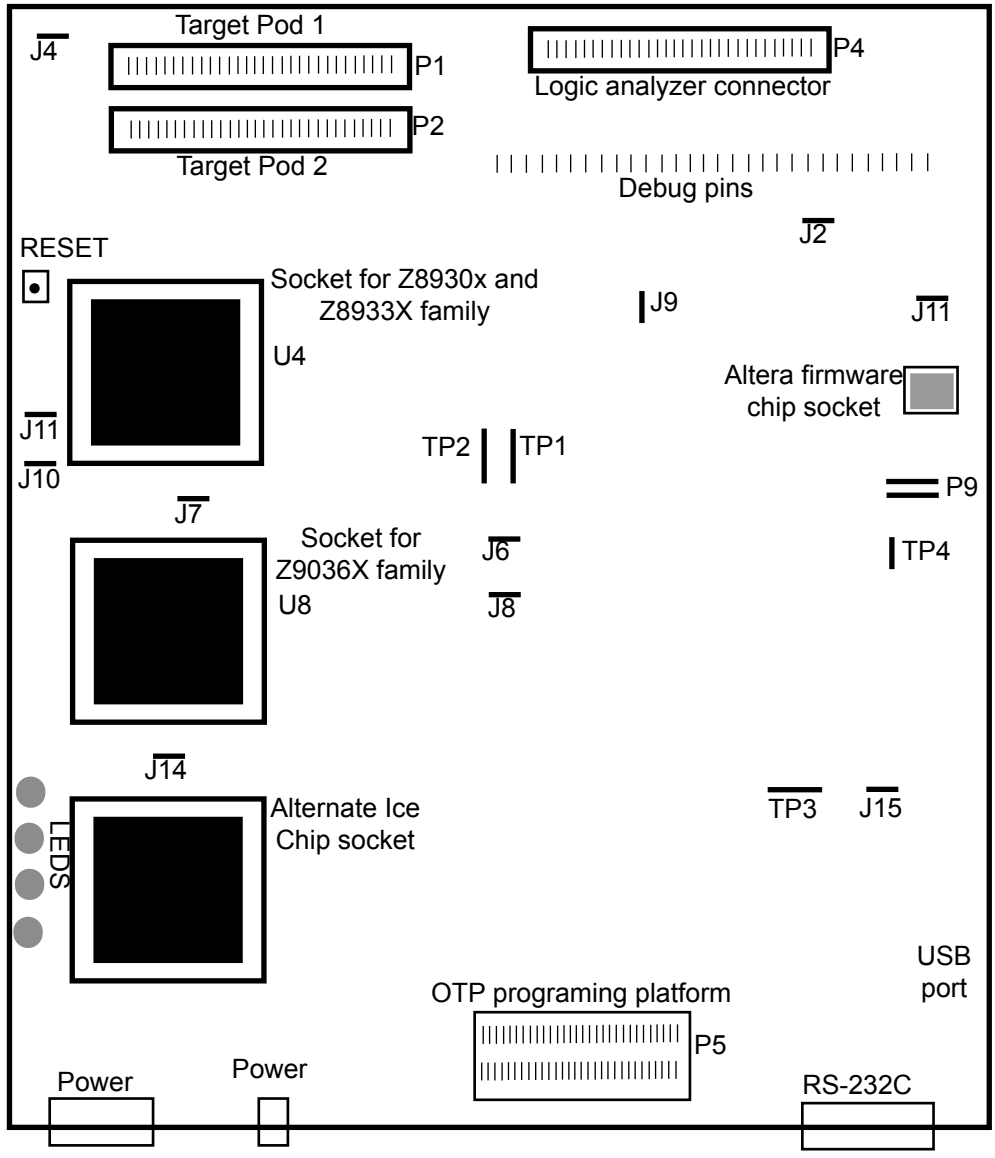

FIGURE 2-4. Z9036900 EMULATOR EXTERNAL TOP VIEW

PERFORMING OTP PROGRAMMING

The Z9036900 Emulator is designed for OTP programming. To perform OTP programming perform the following steps:

1. Locate the supplied OTP adapter for the micro controller you wish to program. Consult Table 1-1for the proper OTP adapter.
2. Insert the OTP adapter into the emulator's OTP Programming socket.

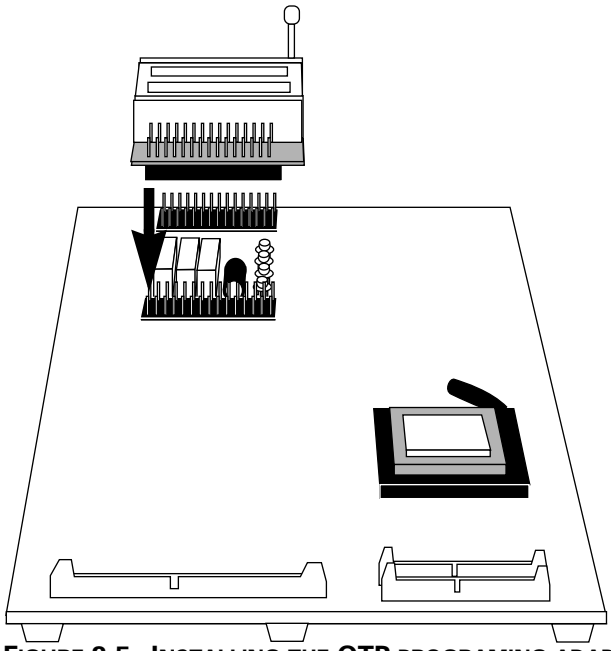

FIGURE 2-5. INSTALLING THE OTP PROGRAMING ADAPTER

3. Place the micro controller into the OTP programing adapter.
4. If the adapter is equipped with a zif socket, ensure that the zif socket locking lever is in the down (closed) position.
5. Perform OTP programing. Consult the ZDS user manual for more information on OTP programing.
6. Pull straight up on the micro controller to remove it from the OTP programing adapter.

NOTE: Be careful not the bend the micro controller's pins when removing it from the OTP adapter.

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CHAPTER 3
OVERVIEW

EMULATION

The Z9036900 emulator comes with two removable ICE chips, the Z9035912GSE and the Z8930912GSE. These two chips allow the user to emulate Z8930X, Z8933X, Z9036X, Z9034X and Z9035X families of ZiLOG micro controller. The emulator is also capable of OTP programming for the family being emulated.

USING ZDS

This emulator is fully comp[atible with ZiLOG Developer Studio (ZDS) software. The following steps briefly describe the procedures necessary to setup and create projects with the Z9036900 emulator. A summary of the emulator'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 EMULATOR

To select the emulator and create a new project perform the following steps:

1. Open ZDS by selecting Start>Programs>Zilog Developer Studio 2.00> ZDS 2.00.
2. Choose New Project from the File menu. The New Project dialog box appears.

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.

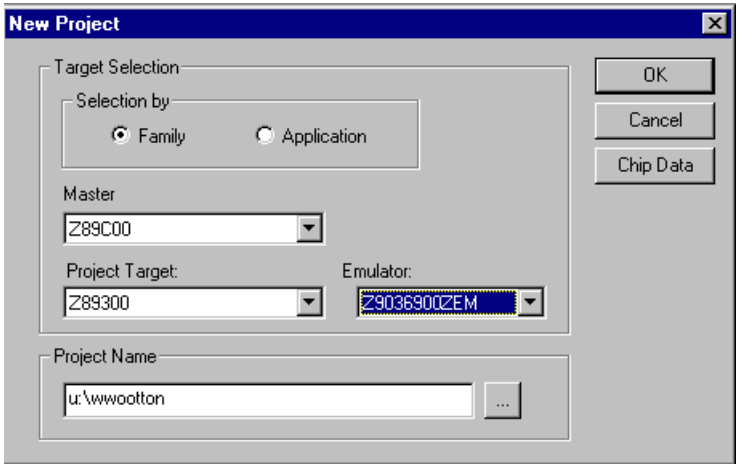

FIGURE 3-1. NEW PROJECT DIALOG BOX

3. Select Family in the Selection by field.
4. Select Z89C00 from the Master pop-up list.
5. Select a micro controller from the Z8930X, Z8933X , Z9036X, Z9034X or Z9035X family in the Project Target pop-up list.
6. Select Z9036900ZEM in the Emulator pop-up list.

7. Click on the browse button (...) in the Project Name field. The New Project Browse 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 will be 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 micro controller 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.

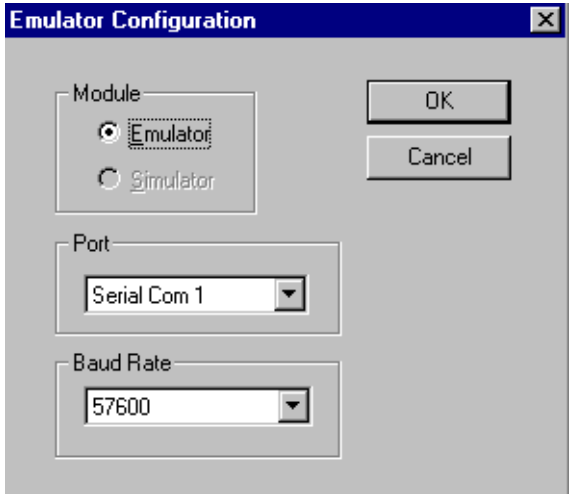

FIGURE 3-2. EMULATOR CONFIGURATION DIALOG BOX

13. Ensure that Emulator is selected in the Module field.
14. Select the port the emulator 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.

To open a previously created project perform the following steps:

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.

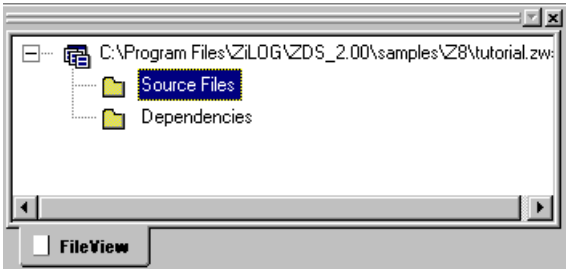

FIGURE 3-3. PROJECT VIEWER WINDOW

Add an existing file

To add an existing file to a project perform the following steps:

1. Select Add to Project>Files from the Project menu. The Insert Files into Project dialog box appears.

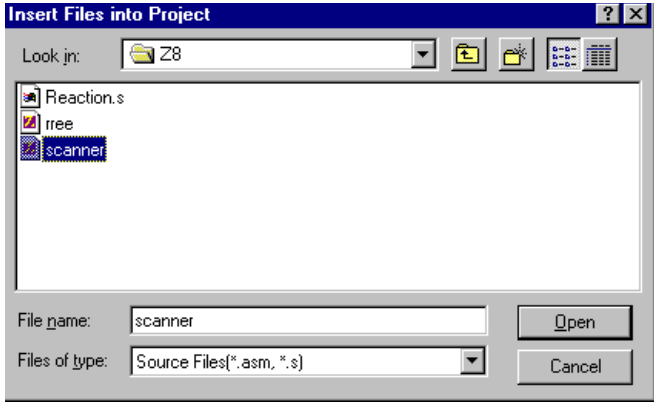

FIGURE 3-4. INSERT FILES INTO PROJECT DIALOG BOX

2. Select the file to add to the project.
3. Click Open. The file appears in the Project Viewer window.

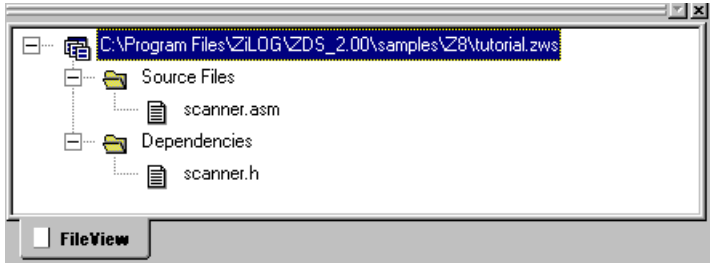

FIGURE 3-5. PROJECT VIEWER WINDOW WITH FILE

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 will be 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 will detect those called by the source code.

AVAILABLE DEBUG WINDOWS

The following table list the debug window that are available using ZDS.

TABLE 3-1. DEBUG WINDOWS

Window	Function *Updated values will display in red*
Watch 	• Shows the symbols and the contents of the registers (*see the ZDS user manual for more information)*
Registers	• Shows the contents of registers
External Registers	• Shows the contents of all external registers • Edit all write-able registers from this window
Code Memory 	• Allows the user to monitor, edit, and download a `file.ld` or `file.hex` into the 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
Data Memory Bank 0	• Shows Data in Memory Bank 0 • Monitor and edit the ICE chips internal RAM data by typing an address in the Bank Address edit box
Data Memory Bank 1	• Shows Data in Memory Bank 1 • Monitor and edit the ICE chips internal RAM data by typing an address in the Bank Address edit box

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 the 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 Emulator on page 3-2 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. Check if power supply is supplying the required current (1.0A typical, 1.5A maximum) to the emulator .
8. Check the selected port using another application or select another COM port.
9. After resetting the emulator, wait a minimum of 5 seconds before running ZDS.

COUNTER JUMPS TO UNEXPECTED ADDRESS

If any instruction other than a DI instruction is used to disable interrupts, the possible causes could include:

- The stack overflows into the general register locations
- An extra POP, PUSH, IRET, or RET is encountered (stack unbalanced)
- The 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
- An unintialized interrupt vector is being 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 in 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. When this message occurs check the following:

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 user manual for more information on establishing communication with an emulator).

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APPENDIX B

ASCII CHARACTER SET

TABLE B-1. 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

TABLE B-1. ASCII CHARACTER SET (CONTINUED)

Graphic	Decimal	Hexadecimal	Comments
	16	10	Data Link Escape
	17	11	Device Control 1
	18	12	Device Control 2
	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

TABLE B-1. ASCII CHARACTER SET (CONTINUED)

Graphic	Decimal	Hexadecimal	Comments
(	40	28	Opening (Left) Parenthesis
)	41	29	Closing (Right) Parenthesis
*	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

TABLE B-1. ASCII CHARACTER SET (CONTINUED)

Graphic	Decimal	Hexadecimal	Comments
@	64	40	Commercial At
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 B-1. 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
o	111	6F	Lowercase O

TABLE B-1. ASCII CHARACTER SET (CONTINUED)

Graphic	Decimal	Hexadecimal	Comments
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's 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. #	**ZiLOG**, Inc.
Software Version	System Test/Customer Support
Manual Number	910 E. Hamilton Ave., Suite 110, MS 4-3
Host Computer Description/Type	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

ABS	Absolute Value
Address Space	Physical or logical area of the target system's Memory Map. The memory map could be physically partitioned into ROM to store code, and RAM for data. The memory can also be divided logically to form separate areas for code and data storage.
ANSI	American National Standards Institute.
ASAP	As Soon As Possible.
ASCII	American Standard Code of Information Interchange.
ASM	Assembler File.
ASYNC	Asynchronous Communication Protocol.
ATM	Asynchronous Transfer Mode.
B	Binary.
Baud	Unit of measure of transmission capacity.
Binary	Number system based on 2. A binary digit is a bit.

BISYNC	Bidirectional Synchronous Communication Protocol.
Bisynchronous Communications	A protocol for communications data transfer used extensive in mainframe computer networks. The sending and receiving computers synchronize their clocks before data transfer may begin.
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.
Buffer	Storage Area in Memory.
Bug	A defect or unexpected characteristic or event.
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.
CALL	This command invokes a subroutine
Checksum	A field of one or more bytes appended to a block of n words which contains a truncated binary sum formed from the contents of that block. The sum is used to verify the integrity of data in a ROM or on a tape.
COM	Device name used to designate a communication port.

Control Section	A continuous logical area containing code or user data. Each control section has a name. The linker puts all those control sections with the same name in one entity. The linker provides address spaces to the control sections. There are either absolute control sections or relocatable ones.
CPU	Central Processing Unit.
Cross-Linkage Editor	A linkage editor that executes on a processor that is not the same as the target processor.
DI	Disable Interrupt.
DIP	Dual In-line Package. The plastic housing designed to be attached directly to a circuit board or equipment case.
DSP	Digital Signal Processing. A specialized microprocessor that is tailored to perform high repetition math processing and improve signal quality.
EPROM	Erasable Programmable Read-Only Memory.
EEPROM	Electrically Erasable Programmable Read-Only Memory.
EI	Enable Interrupt.
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.
External Symbol	A symbol that is referenced in the current program file but is defined in another program file.

GUI	Graphical User Interface. The windows and text that a user sees on their computer screen when they are using a program.
H	Hexadecimal, Half-Carry Flag.
Hex	Hexadecimal.
Hexadecimal	A Base-16 Number System. Hex values are often substituted for harder to read binary numbers.
IC	Integrated Circuit.
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.
ID	Identifier.
IE	Interrupt Enable.
IM	Immediate Data Addressing Mode.
IMASK	Interrupt Mask Register.
IMR	Interrupt Mask Register.
INC	Increment.
INCW	Increment Word.
Initialize	To establish start-up parameters, typically involving clearing all of some part of the device’s memory space.

Instruction	Command.
INT	Interrupt.
Internal Symbol	A symbol that is defined in a program file. This symbol could be visible to multiple functions within the same program file.
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.
IPR	Interrupt Priority Register.
Ir	Indirect Working-Register Pair Only.
IR	Infrared. A light frequency range just below that of visible light.
IRQ	Interrupt Request.
ISDN	Integrated Services Digital Network.
ISO	International Standards Organization.
JP	Jump.
JR	Jump Range.
Library	A File Created by a Librarian. This file contains a collection of object modules that were created by an assembler or directly by a C compiler.
Local Symbol	Symbol visible only to a particular function within a program file.
Lock Limits	Limits set in a financial program that cannot be surpassed.

LSB	Least Significant Bit.
LSI	Large Scale Integration. A chip that contains 500 to 5,000 gates or transistors.
M1	Machine Cycle 1.
MCU	Microcontroller or Microcomputer Unit.
MI	Minus.
MLD	Multiply and Load.
MPYA	Multiply and ADD.
MPYS	Multiply and Subtract.
MSB	Most Significant Bit.
Nibble	A Group of 4 Bits.
NMI	Non-Maskable Interrupt.
NOP	No Operation.
Object Module	Programming code created by assembling a file with an assembler or compiling a file with a compiler. These are relocatable object modules and are input to the linker in order to produce an executable file.
OMF	Object Module Format.
OPC	Operation Code.
Op Code	Operation Code.
OTP	One-Time Programmable.

PC	Personal computer, program counter.
PCON	Port configuration register.
PER	Peripheral. A device which supports the import or output of information.
POP	Retrieve a Value from the Stack.
POR	Power-On Reset.
Port	The point at which a communications circuit terminates at a Network, Serial, or Parallel Interface card.
PRE	Prescaler.
PROM	Programmable Read-Only Memory.
Protocol	Formal set of communications procedures governing the format and control between two communications devices. A protocol determines the type of error checking to be used, the data compression method, if any, how the sending device will indicate that it has finished sending a message, and how the receiving device will indicate that it has received a message.
PRT	Programmable Reload Timer or Print.
PTR	Pointer.
PTT	Post, Telephone, and Telegraph. Agency in many countries that is responsible for providing telecommunication approvals.
Public/Global Symbol	A programming variable that is available to more than one program file.
PUSH	Store a Value In the Stack.

r	Working Register Address.
R	Register or Working-Register Address, Rising Edge.
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.
RC	Resistance/Capacitance.
RD	Read.
RES	Reset.
Resolution	In a digital image, the total number of pixels in the horizontal and vertical directions.
RFSH	Refresh.
ROM	Read-Only Memory. Nonvolatile memory that stores permanent programs. ROM usually consists of solid-state chips.
ROMCS	ROM Chip Select.
RP	Register Pointer.
RR	Read Register or Rotate Right.
RS-232C	Electronic Industries Association Standard for Asynchronous Transmissions Between a Computer and a Peripheral Device.
SCF	Set C Flag.

Schedule	Financial Schedule. Computes the costs and profits for each significant product line item (by PSI) for a given period, usually a fiscal month.
SIO	Serial Input/Output.
SL	Shift Left or Special Lot.
SLL	Shift Left Logical.
SMR	Stop Mode Recovery.
SN	Serial Number.
SOIC	Small Outline IC.
SP	Stack Pointer.
SPH	Stack Pointer High.
SPI	Serial Peripheral Interface.
SPL	Stack Pointer Low.
SRAM	Static Random Access Memory.
SR	Shift Right.
SRA	Shift Right Arithmetic.
SRC	Source.
SSI	Small Scale Integration. Chip that contains 5 to 50 gates or transistors.
Static	Characteristic of Random Access Memory that enables It to operate without clocking signals.

ST	Status.
STKPTR	Stack Pointer.
SUB	Subtract.
SVGA	Super Video Graphics Adapter.
S/W	Software.
SWI	Software Interrupt.
Symbol Definition	Symbol defined when the symbol name is associated with a certain amount of memory space, depending on the type of the symbol and the size of Its dimension.
Symbol Reference	Symbol referenced within a program flow, whenever It is accessed for a read, write, or execute operation.
SYNC	Synchronous Communication Protocol. An event or device is synchronized with the CPU or other process timing.
TC	Time Constant.
TCC	Total Cash Compensation, Total Corporate Compliance. Total cash compensation includes base salary plus all other applicable compensation, including shift differential and car allowance.
TCM	Trellis Coded Modulation.
TCR	Timer Control Register.
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.
UGE	Unsigned Greater Than or Equal.
UGT	Unsigned Greater Than.
ULE	Unsigned Less Than or Equal.
ULT	Unsigned Less Than.
UM	User's Manual.
USART	Universal Synchronous/Asynchronous Receiver/Transmitter. Can handle synchronous as well as asynchronous transmissions.
USB	Universal Serial Bus.
USC	Universal Serial Controller.
UTB	Use Test Box. A board or system to test a particular chip in an end-use application.
V	Volt, Overflow Flag.
V_{CC}	Supply Voltage.
V_{DD}	Voltage from the Digital Power Supply.
V_{PP}	Programmed Voltage.
VRAM	Video Random-Access Memory. A special form of RAM chip that has a separate serial-output port for

	display refresh operations. This architecture speeds up video adaptor performance.
V_{REF}	Analog Reference 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 older manuals refer to this timer as the WDTMR.
WDTOUT	Watch-Dog Timer Output.
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.
WR	Write.
WS	Wafer Sort.
X	Indexed Address, Undefined.
XOR	Bitwise Exclusive OR.
XTAL	Crystal.
Z	Zero, Zero Flag.
Z8	ZiLOG Chip.
ZAC	ZiLOG Accessory Kit.
ZASM	ZiLOG Assembler. ZiLOG's program development environment for DOS.

ZDS	ZiLOG Developer Studio. ZiLOG's program development environment for Windows 95/NT.
ZEM	ZiLOG Emulator.
ZiLOG Symbol Format	Three fields per symbol including a string containing the Symbol Name, a Symbol Attribute, and an Absolute Value in Hexadecimal.
ZLD	ZiLOG Linkage Editor. Cross linkage editor for ZiLOG's microcontrollers.
ZLIB	ZiLOG Librarian. Librarian for creating library files from locatable object modules for the ZiLOG family of microcontrollers.
ZMASM	ZiLOG Macro Cross Assembler. ZiLOG's program development environment for Windows 3.1.
ZOMF	ZiLOG's Object Module Format. The object module format used by the linkage editor.

ZiLOG

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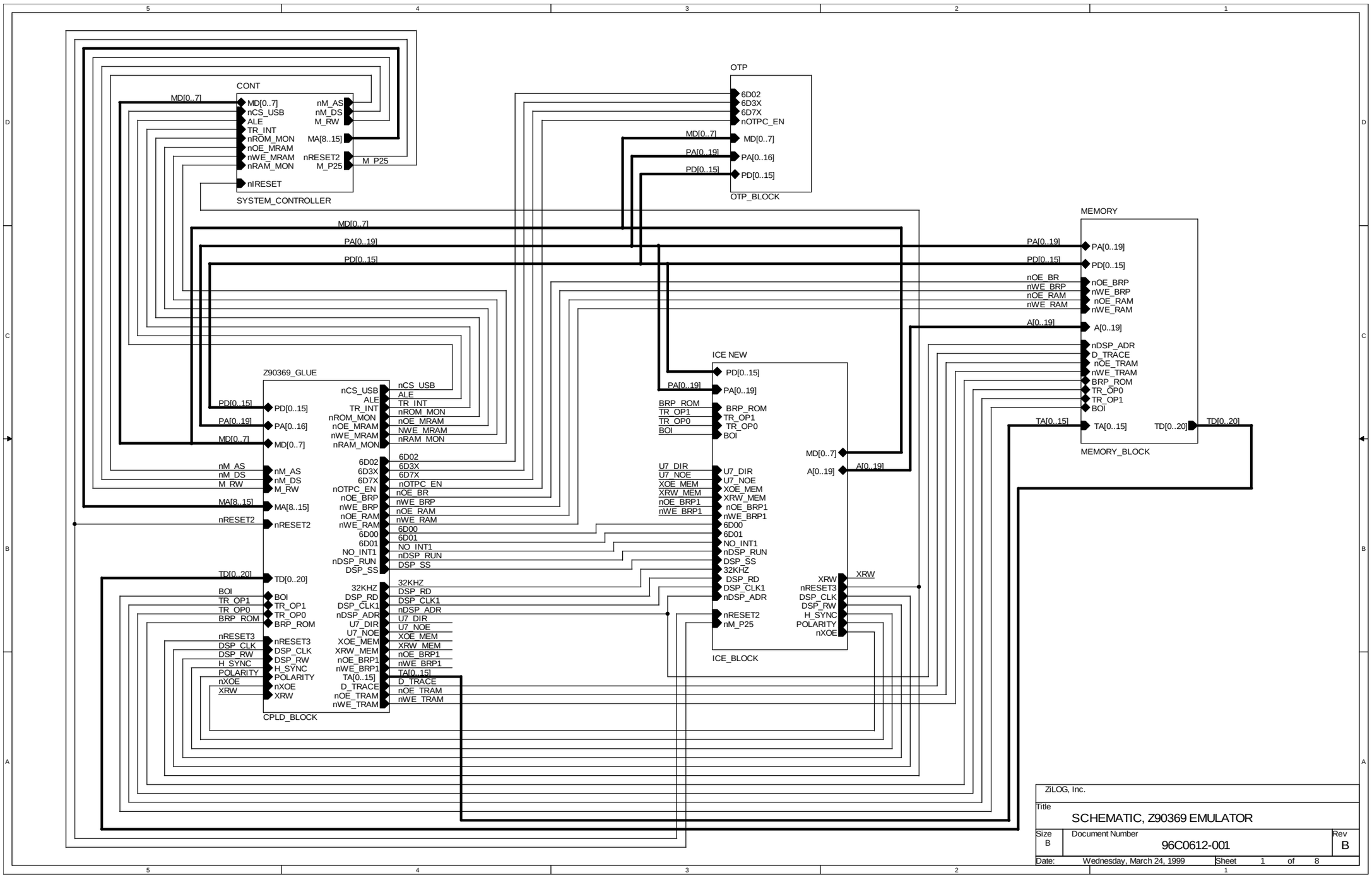
INDEX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ALE
TR_INT
nROM_MON
nOE_MRAM
nWE_MRAM
nRAM_MON
nIRESET
nM_AS
nM_DS
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6D3X
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nM_DS
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BRP_ROM
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TR_INT
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nWE_MRAM
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6D00
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NO_INT1
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DSP_CLK1
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U7_DIR
U7_NOE
XOE_MEM
XRW_MEM
nOE_BRP1
nWE_BRP1
6D00
6D01
NO_INT1
nDSP_RUN
DSP_SS
32KHZ
DSP_RD
DSP_CLK1
nDSP_ADR
nRESET2
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MD[0..7]
A[0..19]
XRW
nRESET3
DSP_CLK
DSP_RW
H_SYNC
POLARITY
nXOE
ICE_BLOCK
ZiLOG, Inc.
Title
SCHEMATIC, Z90369 EMULATOR
Size
B
Document Number
96C0612-001
Rev
B
Date:
Wednesday, March 24, 1999
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1
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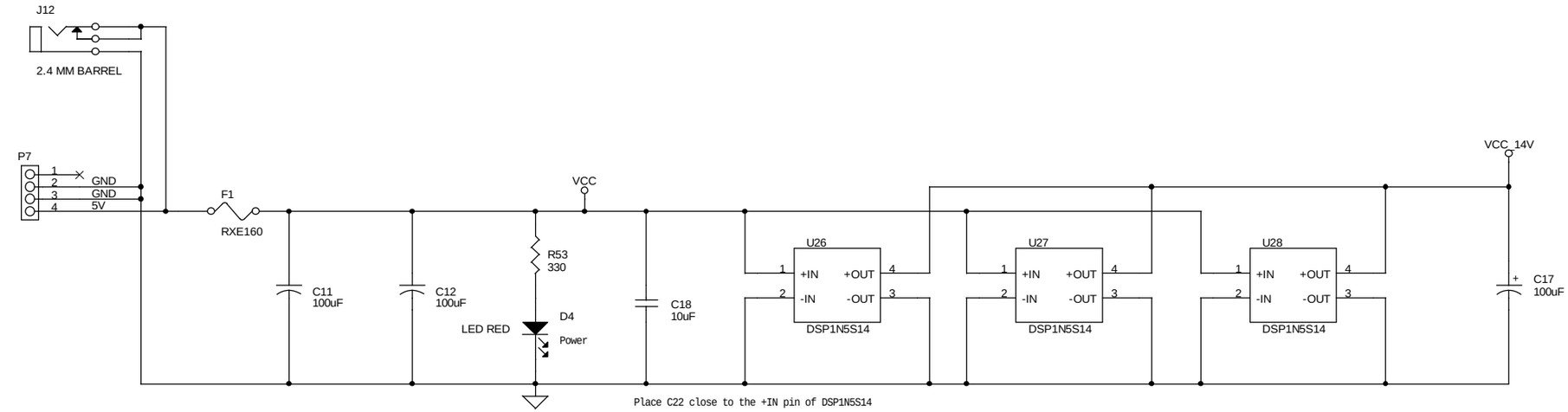
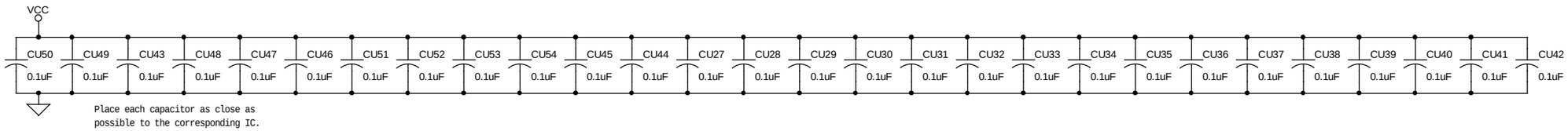
8





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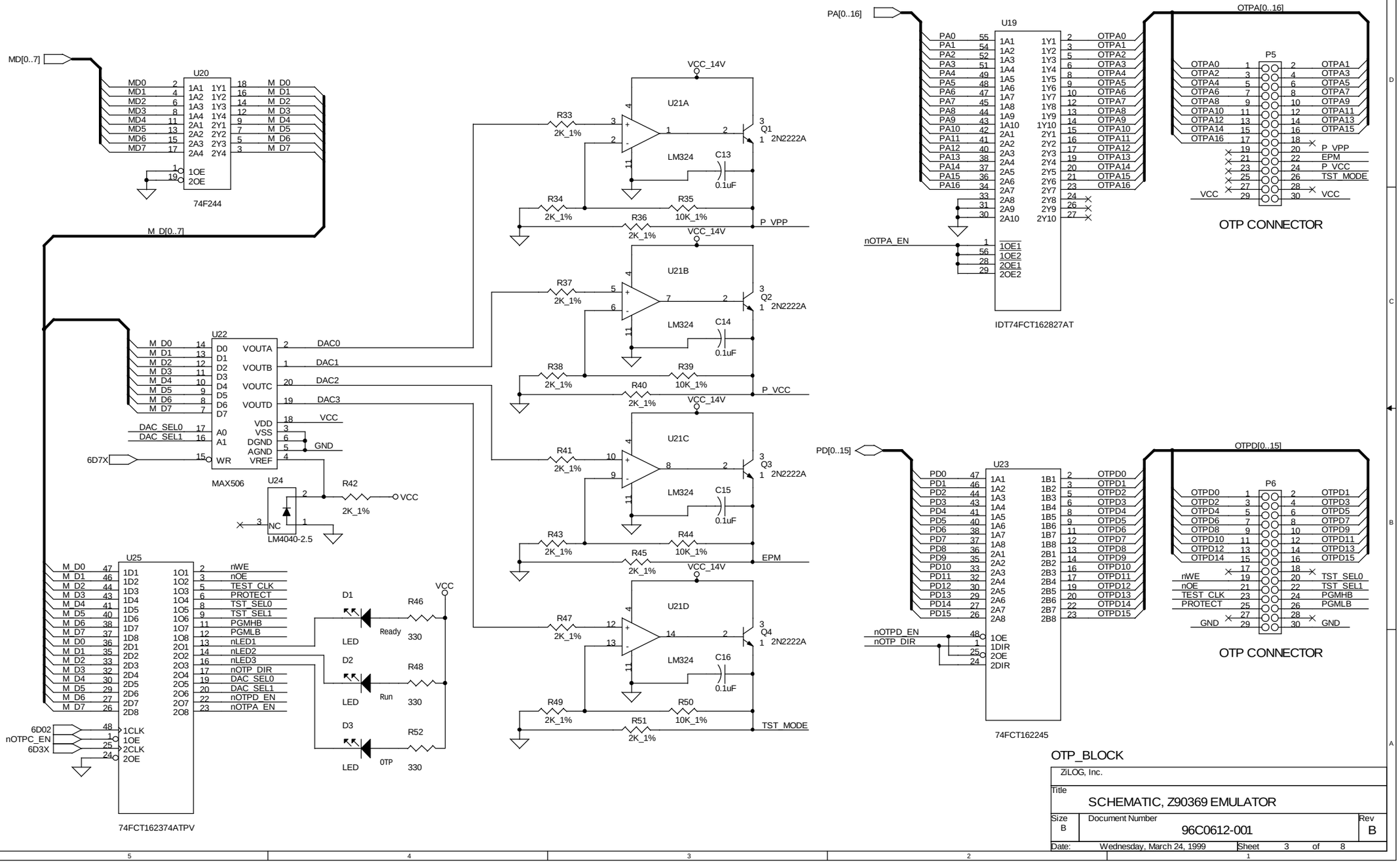

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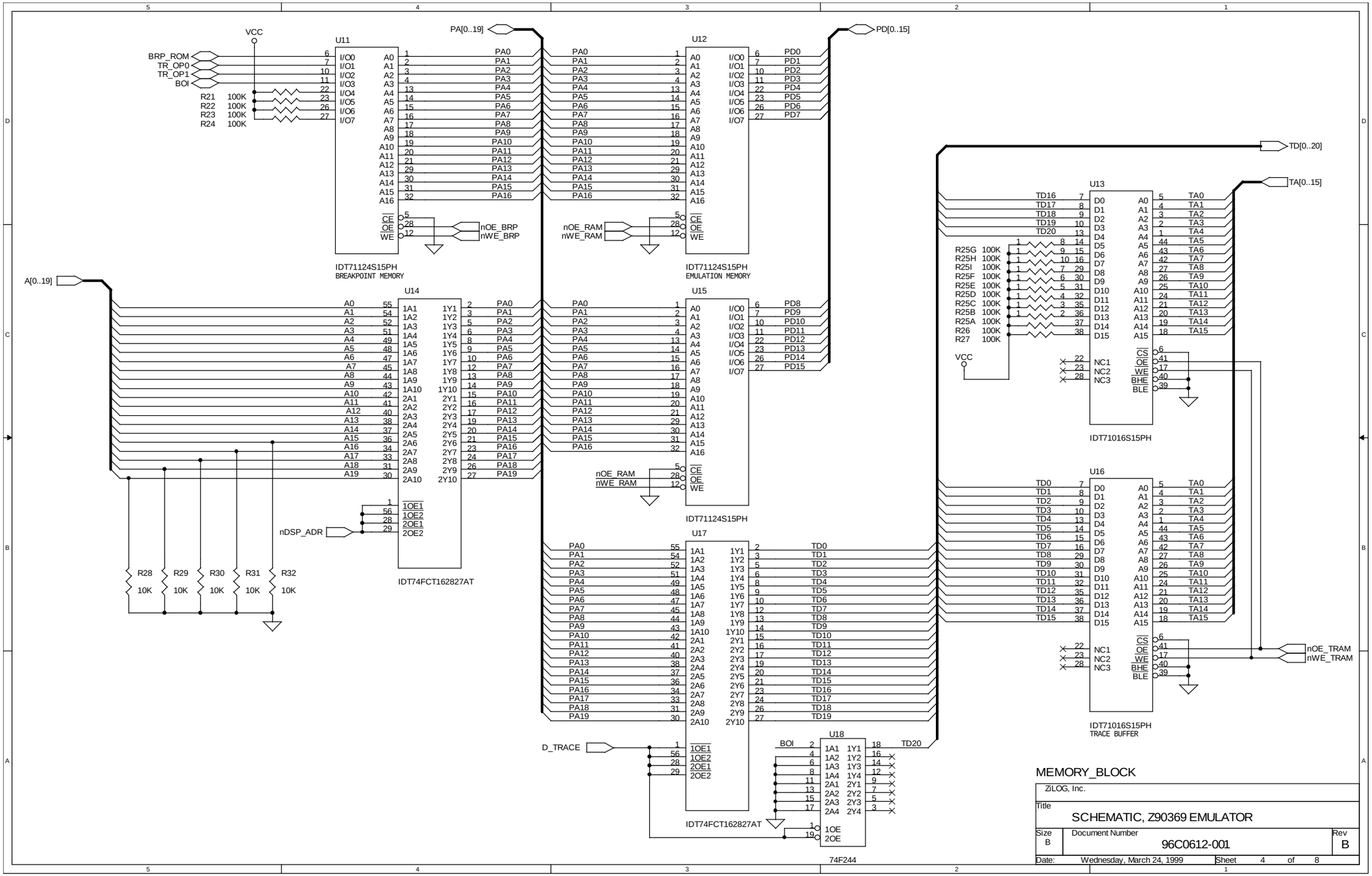
Date: Wednesday, March 24, 1999	Sheet 3 of 8		



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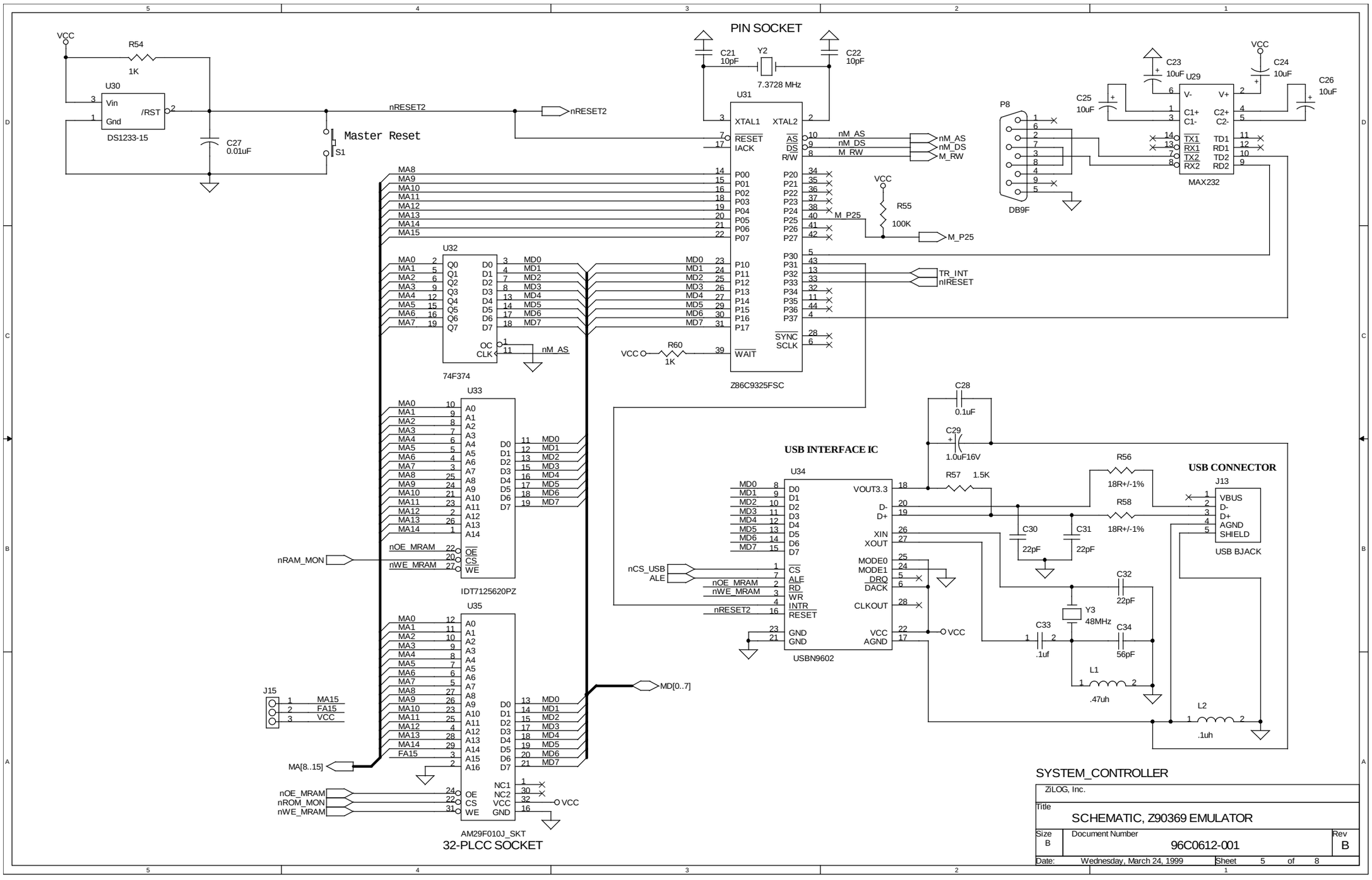
PIN SOCKET
VCC
R54
1K
U30
Vin
/RST
Gnd
DS1233-15
C27
0.01uF
S1
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nRESET2
nRESET2
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10uF
C26
10uF
U29
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V-
V+
C1+
C1-
C2+
C2-
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RX1
TX2
RX2
TD1
RD1
TD2
RD2
C28
0.1uF
C29
1.0uF16V
USB INTERFACE IC
U34
USBN9602
VOUT3.3
D-
D+
XIN
XOUT
MODE0
MODE1
DRQ
DACK
CLKOUT
VCC
AGND
GND
CS
ALE
RD
WR
INTR
RESET
nCS_USB
ALE
R57
1.5K
R56
18R+/-1%
R58
18R+/-1%
C30
22pF
C31
22pF
C32
22pF
Y3
48MHz
C33
.1uf
C34
56pF
L1
.47uh
L2
.1uh
USB CONNECTOR
J13
VBUS
D-
D+
AGND
SHIELD
USB BJACK
SYSTEM_CONTROLLER
ZiLOG, Inc.
Title
SCHEMATIC, Z90369 EMULATOR
Size
B
Document Number
96C0612-001
Rev
B
Date:
Wednesday, March 24, 1999
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5
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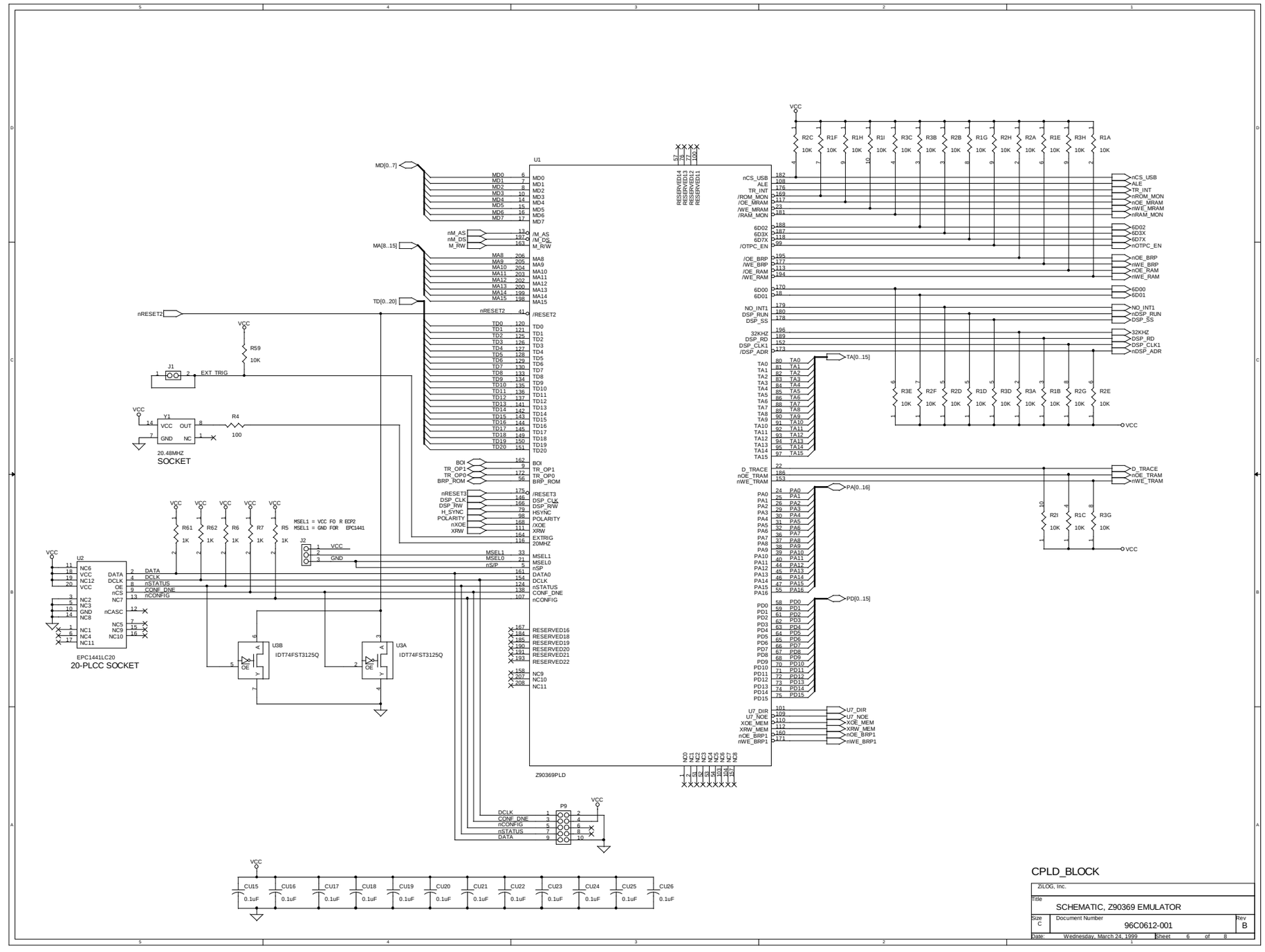
8



CPLD_BLOCK

ZiLOG, Inc.		
Title: SCHEMATIC, Z90369 EMULATOR		
Size: C	Document Number: 96C0612-001	Rev: B
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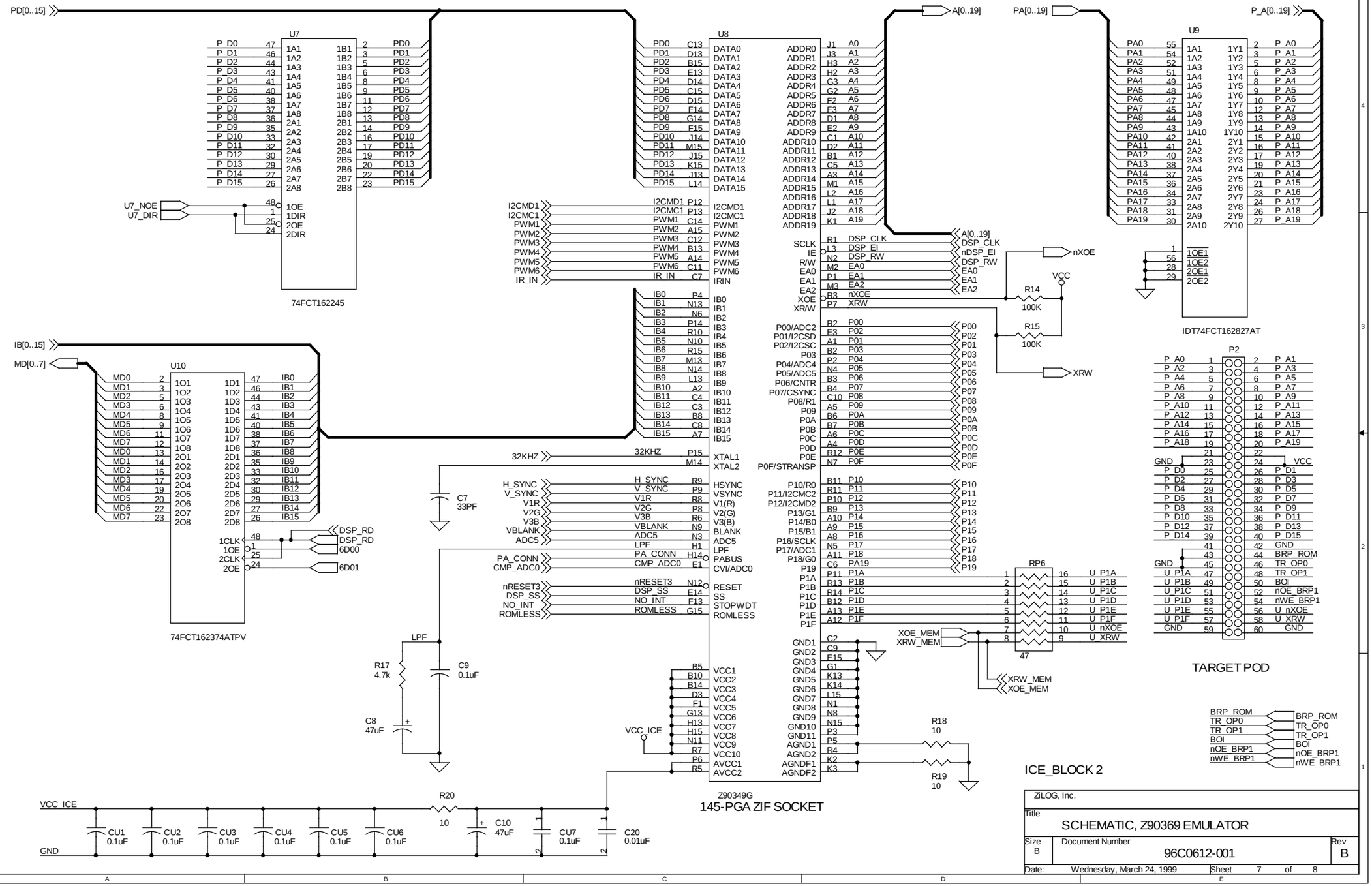
PD[0..15]
U7
74FCT162245
U7_NOE
U7_DIR
U8
Z90349G
145-PGA ZIF SOCKET
A[0..19]
PA[0..19]
P_A[0..19]
U9
IDT74FCT162827AT
IB[0..15]
MD[0..7]
U10
74FCT162374ATPV
DSP_RD
6D00
6D01
I2CMD1
I2CMC1
PWM1
PWM2
PWM3
PWM4
PWM5
PWM6
IR_IN
32KHZ
H_SYNC
V_SYNC
V1R
V2G
V3B
VBLANK
ADC5
LPF
PA_CONN
CMP_ADC0
nRESET3
DSP_SS
NO_INT
ROMLESS
SCLK
IE
R/W
EA0
EA1
EA2
XOE
XR/W
DSP_CLK
nDSP_EI
DSP_RW
nXOE
XRW
VCC
R14
100K
R15
100K
P00/ADC2
P01/I2CSD
P02/I2CSC
P03
P04/ADC4
P05/ADC5
P06/CNTR
P07/CSYNC
P08/R1
P09
P0A
P0B
P0C
P0D
P0E
P0F/STRANSP
P10/R0
P11/I2CMC2
P12/I2CMD2
P13/G1
P14/B0
P15/B1
P16/SCLK
P17/ADC1
P18/G0
P19
P1A
P1B
P1C
P1D
P1E
P1F
RP6
47
XOE_MEM
XRW_MEM
XRW_MEM
XOE_MEM
P2
TARGET POD
BRP_ROM
TR_OP0
TR_OP1
BOI
nOE_BRP1
nWE_BRP1
C7
33PF
LPF
R17
4.7k
C9
0.1uF
C8
47uF
VCC_ICE
R18
10
R19
10
R20
10
C10
47uF
CU1
0.1uF
CU2
0.1uF
CU3
0.1uF
CU4
0.1uF
CU5
0.1uF
CU6
0.1uF
CU7
0.1uF
C20
0.01uF
GND
ICE_BLOCK 2
ZiLOG, Inc.
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Size B
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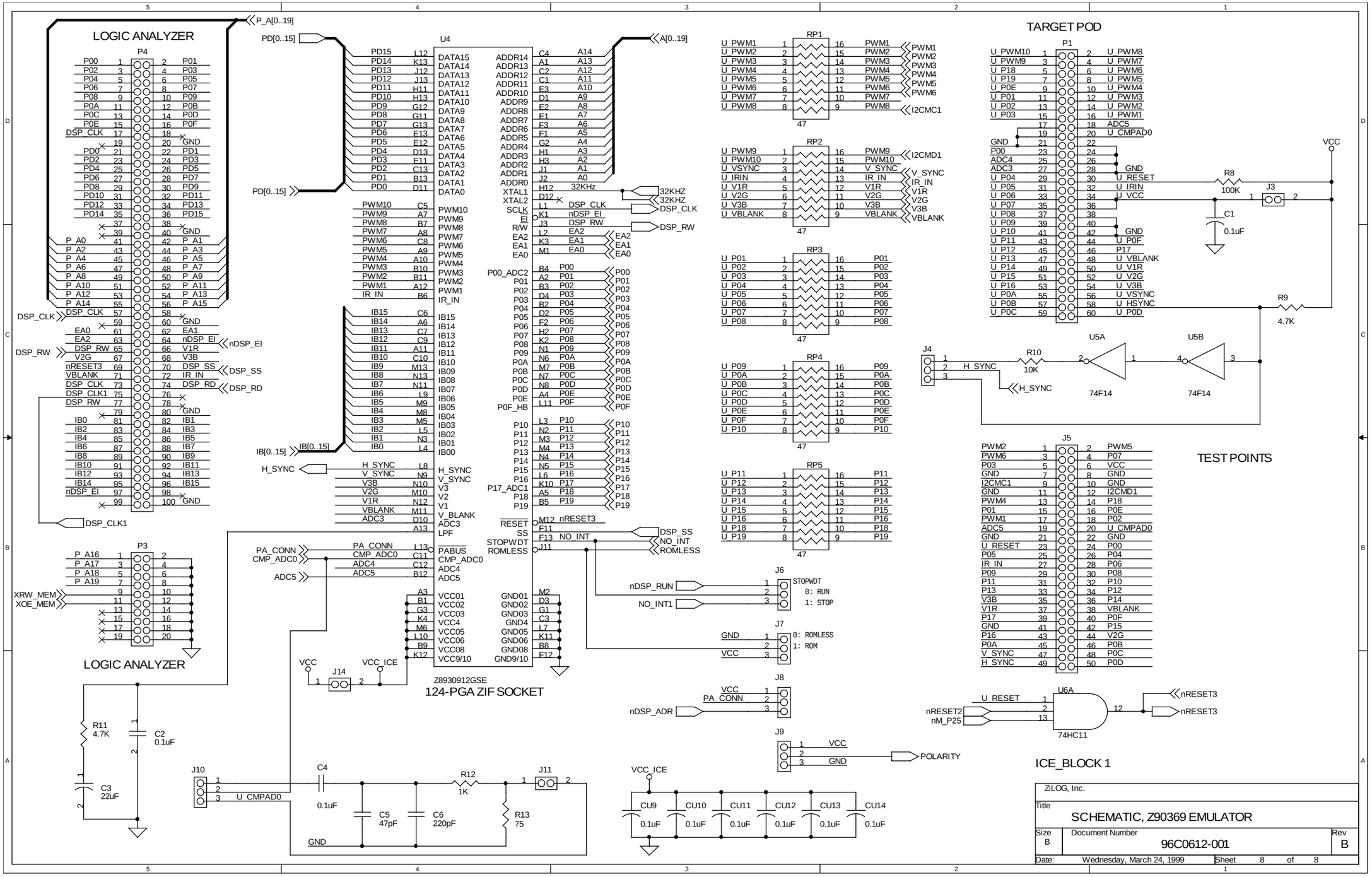
LOGIC ANALYZER
P4
P_A[0..19]
PD[0..15]
U4
A[0..19]
Z8930912GSE
124-PGA ZIF SOCKET
RP1
RP2
RP3
RP4
RP5
TARGET POD
P1
R8
100K
J3
C1
0.1uF
VCC
R9
4.7K
U5A
U5B
74F14
J4
R10
10K
J5
TEST POINTS
J6
STOPWDT
0: RUN
1: STOP
J7
0: ROMLESS
1: ROM
J8
J9
POLARITY
U6A
74HC11
LOGIC ANALYZER
P3
XRW_MEM
XOE_MEM
J14
VCC_ICE
R11
4.7K
C2
0.1uF
C3
22uF
J10
U_CMPAD0
C4
0.1uF
C5
47pF
C6
220pF
R12
1K
R13
75
J11
GND
CU9
CU10
CU11
CU12
CU13
CU14
0.1uF
ICE_BLOCK 1
ZiLOG, Inc.
SCHEMATIC, Z90369 EMULATOR
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