ZLP128ICE01ZEM

Crimzon™ In-Circuit Emulator

User Manual

UM018403-0207

Introduction

Thank you for purchasing the ZiLOG Crimzon™ In-Circuit Emulator (ICE). The Crimzon ICE provides Crimzon chip family emulation with a trace and event system for program debugging using ZDS II development tools. Once your code is complete, use the included OTP programming module to burn your design to OTP devices.

This startup guide tells you how to:

1. Install ZDS II software.
2. Configure the Crimzon ICE for connection to your PC.
3. Use a supplied target Pod to connect the Crimzon ICE to either the IR development board included with the kit or a target board of your design with a 20- or 28-PDIP socket. (Converters for 20- and 28-SOIC and SSOP sockets are included. A 40-PDIP pod is available as part of accessory kit ZLP323ICE01ZAC, ordered separately.)

Note: See "Technical Information on the IR Development Board" on page 30 for details for using the IR development board, including jumper settings and keypad operation.

4. Connect the Crimzon ICE to a supplied OTP programming module.
5. Use the supplied OTP programming module with ZDS II software to program a 20-, 28-, or 40-PDIP Crimzon family device. Adapters for 20- and 28-SOIC and SSOP packages are included. An adapter for 48-SSOP packages is available as part of accessory kit ZLP323ICE01ZAC, ordered separately.)
6. Run a demonstration program to verify proper operation, illustrate basic operation of the trace and event system, and burn a Crimzon OTP device using the OTP programming module.

Note: The IR development board shipped with the Crimzon ICE is provided for use as a development tool only. Its IR photodiode is inverted and biased to eliminate noise interference from the long target cable.

When designing your own system, follow the guidelines provided in the *ZLP12840 Product Specification,* PS0244.

Kit Features

- Emulation and OTP Programming support for the Crimzon Family
- Emulation Pod and adapters for 20 and 28 Pin Packages
- IR Development Board
- Trace and Event System
- Ethernet and USB Interface
- Up to 8MHz Clock Frequency
- 2.0v to 3.6V V_{DD}
- ZiLOG Developer Studio
- Assembler and Full ANSI C Compiler
- Documentation
- Sample OTP Devices

Software Requirements

Table 1 lists the PC requirements for running ZDS II.

Table 1. ZDS II System Requirements

Recommended Configuration	Minimum Configuration
• PC running Windows XP Professional • Pentium III/500-MHz processor • 128 MB RAM • 65 MB hard disk space • Super VGA video adapter • CD-ROM drive • Ethernet port • USB high-speed or full-speed port • One or more RS-232 communications ports • Internet browser (Internet Explorer or Netscape)	• PC running Windows 98 SE or Windows NT 4.0 SP6 • Pentium II/233-MHz processor • 96 MB RAM • 25 MB hard disk space (documentation not included) • Super VGA video adapter • CD-ROM drive • Ethernet port • One or more RS-232 communications ports • Internet browser (Internet Explorer or Netscape)

Note: Windows NT does not support USB.

Install the Software

Follow these steps to install ZDS II with the ANSI C-Compiler:

1. Insert the ZDS II CD into your computer's CD-ROM drive. *DemoShield* launches automatically. If it does not automatically launch, go to the root of the CD-ROM and double-click the file `launch.exe`.
2. *DemoShield* provides several installation choices. Select "Install ZDS II" to install now. You can install other software and accompanying documentation later.
3. Follow the instructions on the screen to complete the installation.

To receive free technical support, please register your software at http://www.zilog.com. Access the registration page by opening the Support menu at the top of the web page and clicking "Product Registration."

Install the Hardware

The Crimzon ICE and Programming System features an Ethernet interface, a USB interface, and an RS-232 serial port. Hardware installation consists of:

- Installing a target Pod into a 20- or 28-PDIP socket on a target development board, such as the IR development board included with the kit;
- Connecting the Crimzon ICE to the target pod;
- Connecting the Crimzon ICE to the OTP programming module; and
- Connecting the Crimzon ICE to a PC.

You may have to reconfigure network settings on the PC or on the Crimzon ICE before using the emulator.

Installing a Target Pod onto a Target Development Board

Use an appropriate target pod and pin converter to connect the Crimzon ICE to the target board. See Figure 1 for an illustration of the Crimzon ICE top panel connectors, and Figure 2 for an illustration of the IR development board included with the kit. The 20-, 28, and 40-PDIP target pods plug into the associated PDIP sockets on the target board. For example, if your target board has a 20-SOIC socket, mate the 20-PDIP target Pod onto the 20-PDIP to 20-SOIC converter. Then install the target Pod and converter assembly into the board's 20-SOIC socket.

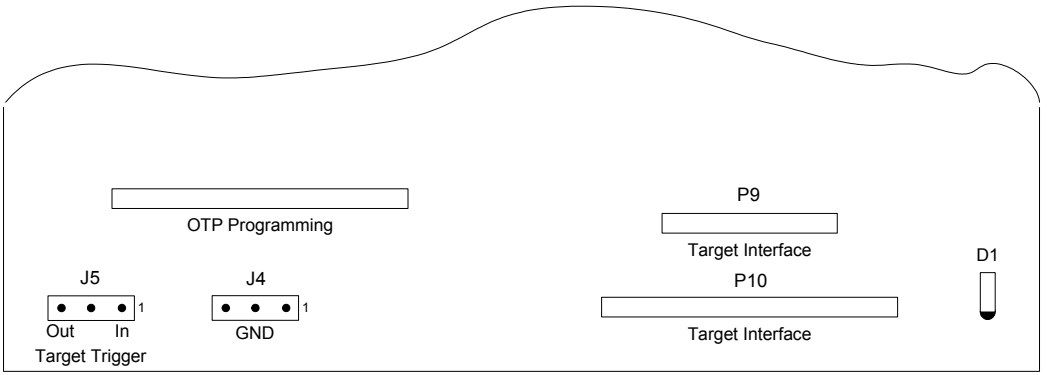

Figure 1. Crimzon ICE Top View

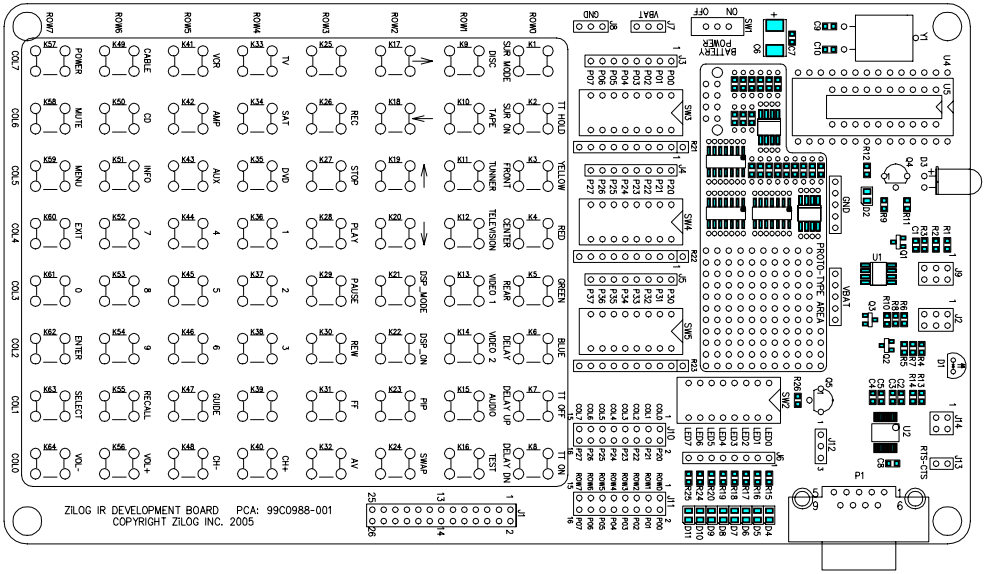

Figure 2. IR Development Board

To set up the 20- and 28-PDIP emulation pods for use in specific applications of Port P31 on the ZLP128ICE01ZEM/G, see Figure 3 on page 5 and Table 2 on page 5.

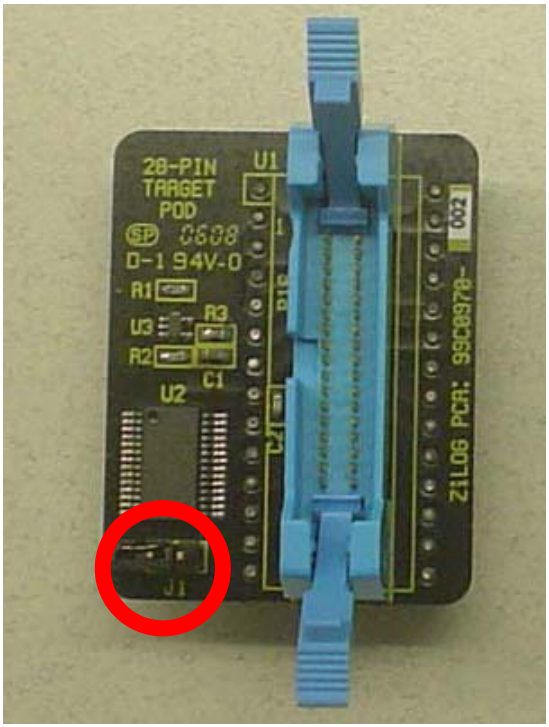

Figure 3. Location of J1 Jumper

Table 2. Jumper Settings

Jumper	Port P31 Function
J1 ON	Infrared (IR) Amplifier
J1 OFF	Digital/Analog

This configuration applies to the 20-PDIP and 28-PDIP emulation pods shipped with

- ZLP128P2X10ZAC/G Rev. A or later
- ZLP128ICE01ZEM Rev. G or later
- ZLP128ICE01ZEMG Rev. A or later

Note: For ZLP128ICE01ZEM Rev. F or earlier releases, refer to the documentation shipped with the kit for the emulation pods. If you have any question, contact ZiLOG technical support at `http://support.zilog.com/support/custom_login.asp`.

Connecting the Crimzon ICE to the Target Pod

Once you have installed the appropriate target Pod (and converter, if required) onto the target development board, connect the Crimzon ICE to the target Pod as follows:

- 40-PDIP and 48-SSOP target Pods:
  - Connect the 20-circuit cable from P9 on the emulator to P2 on the 40-PDIP target Pod. (The 20-circuit cable is included in the 40/48-pin accessory kit, ZLP323ICE01ZAC, ordered separately.)
  - Connect the 34-circuit cable from P10 on the emulator to P1 on the 40-PDIP target Pod.
- 20-PDIP and 28-PDIP target Pods: Connect the 34-circuit cable from P10 on the emulator to P16 on the target Pod. (Emulator connector P9 is not used.)

Connecting the Crimzon ICE to the OTP Programming Module (Optional)

After developing and debugging your software, use the following instructions to connect the Crimzon ICE to the OTP programming module so you can burn your code onto chips.

1. Connect the 40-circuit ribbon cable from the Crimzon ICE OTP Programming connector to connector P1 on the OTP programming module.
2. The 40-PDIP ZIF socket on the OTP programming module is designed to accept 40-PDIP OTP chips. The OTP programming adapters supplied with the Crimzon ICE allow you to adapt the ZIF socket to accept 20-SOIC, 20-SSOP, 20-PDIP, 28-SOIC, 28-SSOP, and 28-PDIP chip packages.

Once you have installed the OTP chip into the ZIF socket (or programming adapter), you are ready to program the chip using the instructions in “OTP Programming” on page 24.

Connecting the Crimzon ICE to a PC

You can connect the Crimzon ICE to a host PC using either an Ethernet or USB port. The USB port option requires that you install the USB drivers included on the ZDS II CD supplied with your emulator.

To connect the Crimzon ICE to a host PC using Ethernet, proceed to “Ethernet Port Connection” on page 7.

To connect the Crimzon ICE to a host PC using a USB port, proceed to "USB Port Connection" on page 15.

Ethernet Port Connection

1. Connect a CAT-5 crossover cable from the PC to the Ethernet port on the Crimzon ICE. See Figure 4.

Note: You can connect the ICE to an Ethernet hub using a CAT-5 patch cable.

2. Connect the serial COM port on the PC to the SETUP serial port on the Crimzon ICE using the DB9-to-DB9 serial cable. See Figure 5.

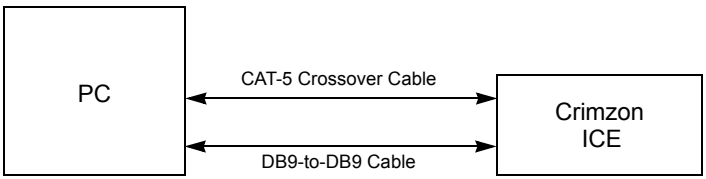

Figure 4. Connecting a PC to the Crimzon ICE

Figure 5. Crimzon ICE Rear Panel

Caution: Ensure the target board is not powered on before proceeding.

3. Connect a 5VDC power supply to the Crimzon ICE. The 3.3VDC and 1.8VDC power LEDs should illuminate (see Figure 5). If either power LED fails to illuminate, or if the ICE Fail LED either blinks continuously or fails to extinguish after 15 seconds (see Figure 6), there is a problem with the unit. Contact ZiLOG support at http://www.zilog.com for a replacement unit.

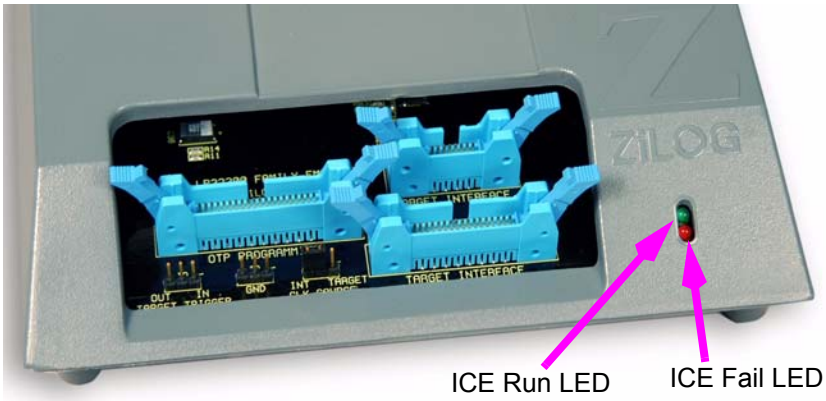

Figure 6. Crimzon ICE Front-Panel

Setting Up Ethernet Communications

The default IP address and subnet mask of the Crimzon ICE are 192.168.1.50 and 255.255.255.0, respectively. To enable communication between the PC running ZDSII and the Crimzon ICE, you must either change the PC's Ethernet settings to match those of the Crimzon ICE or vice versa.

If using the PC in a stand-alone configuration, set the PC's IP address to 192.168.1.21 and its subnet mask to 255.255.255.0. See "Changing the PC's Settings to Match the Crimzon ICE" on page 8.

In a networked environment, set the Crimzon ICE IP address and subnet mask to match the network setup. See "Changing Crimzon ICE Settings to Match the PC" on page 12.

Changing the PC's Settings to Match the Crimzon ICE

After completing the following steps to change the PC's Ethernet settings, proceed to Running a Sample Project on page 18.

Note: The following instructions are for MS Windows XP. If your Windows operating system is different, refer to your MS Windows OS online help for details.

1. Open the Windows Control Panel and double-click the Network and Internet Connections icon. The Network Connections dialog box appears (see Figure 7).

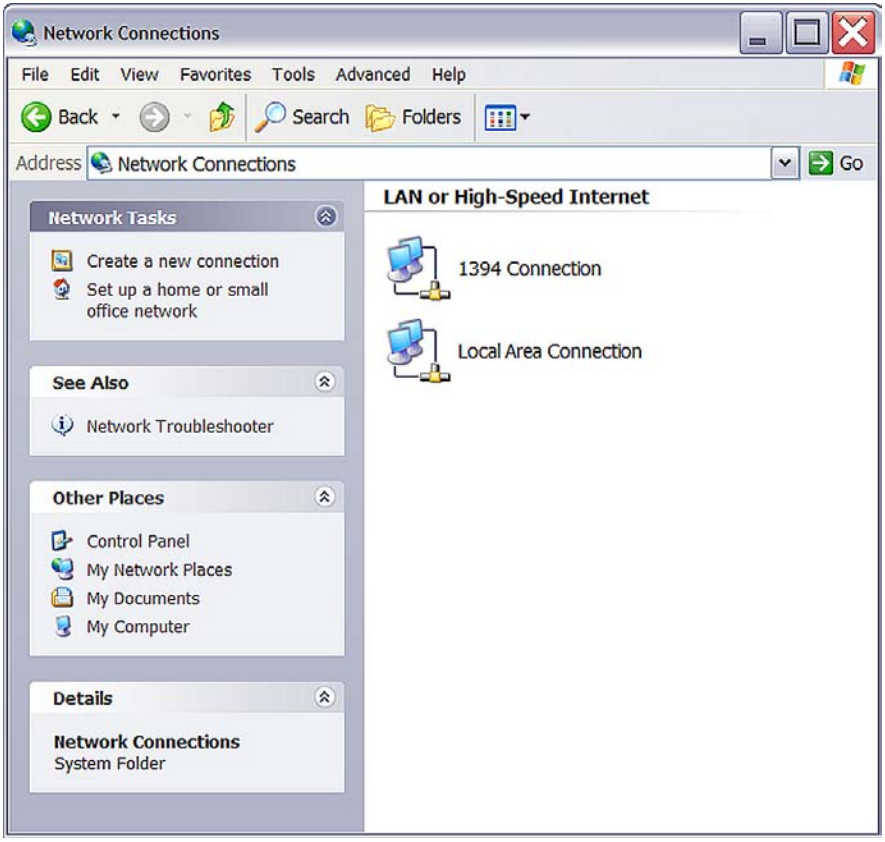

Figure 7. The Network Dialog

2. In the panel labeled LAN or High-Speed Internet, double-click the Local Area Connection icon. The Local Area Connection Status dialog box appears (Figure 8).

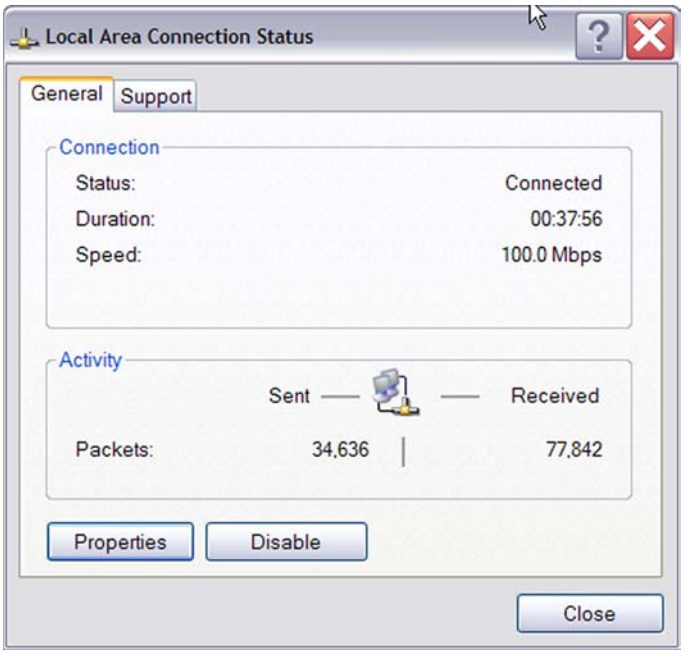

Figure 8. The Local Area Connection Status Dialog

3. In the Local Area Connection Status dialog box, click the Properties button. The Local Area Connection Properties dialog box appears (Figure 9).

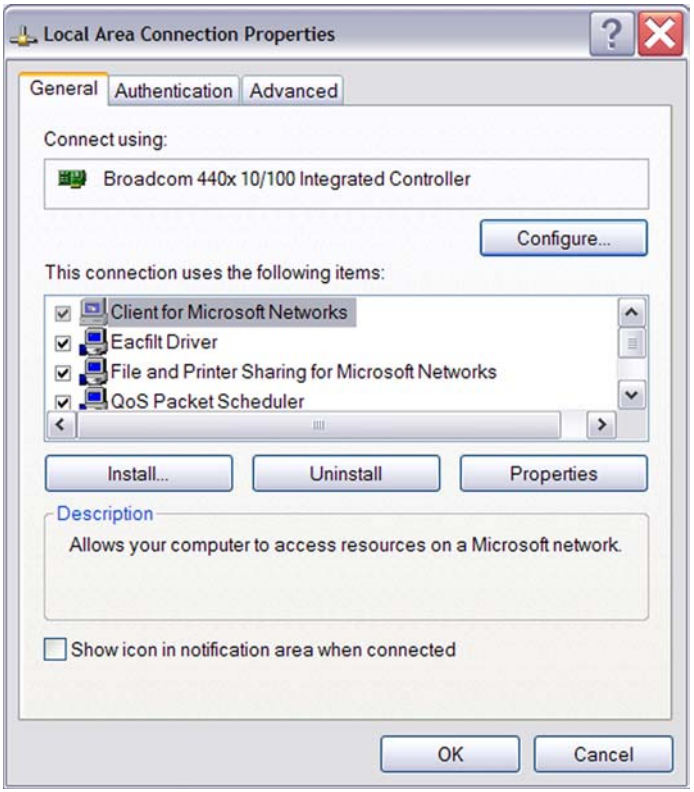

Figure 9. The Local Area Connection Properties Dialog Box

4. In the panel labeled This connection uses the following items:, select the Internet Protocol (TCP/IP) item to highlight it, and click the Properties button. The Internet Protocol (TCP/IP) Properties dialog box appears (Figure 10).

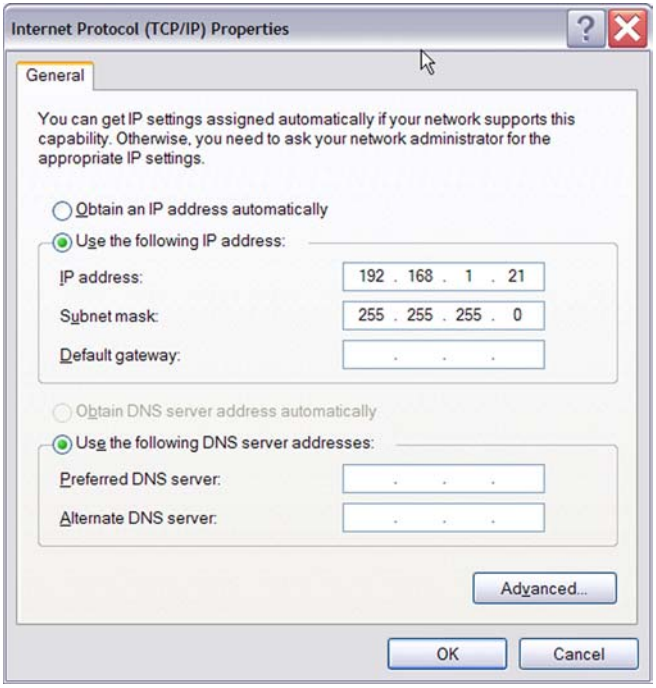

Figure 10. The Internet Protocol Properties Dialog

5. Enter values for the IP address and subnet mask to match those shown in Figure 10. Leave any remaining fields blank. In this example, an IP address of 192.168.1.21 and a subnet mask of 255.255.255.0 are being assigned to the PC. These values place the PC on the same network as the Crimzon ICE unit.
6. Click OK and restart the PC.
7. Proceed to “Running a Sample Project” on page 18.

Changing Crimzon ICE Settings to Match the PC

1. Connect the PC serial port to the Crimzon ICE serial port using the DB9-to-DB9 serial cable.
2. Launch HyperTerminal on the PC by selecting Start --> Programs --> Accessories --> Communications --> HyperTerminal.

3. In the Connect To dialog, set the Connect Using: drop-down menu to match the COM port to which the Crimzon ICE is connected. Click OK.
4. A COM Properties dialog appears. Enter the following port settings and click OK.
   Bits per second:57600
   Data bits:8
   Parity:None
   Stop bits:2
   Flow control:None
5. HyperTerminal should automatically attempt a connection. If not, select Call --> Connect.
6. When the emulator is turned on or reset, a Crimzon ICE console boot-up message appears in HyperTerminal. A typical boot-up message is shown below:

```
ZiLOG Z8 LXM ICE
Firmware Version 2.0, Build (Aug 22 2005 08:14:37)
Copyright (C) 2005 ZiLOG, Inc.  All Rights Reserved.
Adding emac driver...
Attempting to establish Ethernet connection.
10 Mbps Half-Duplex Link established
IP Address: 10.1.7.95
IP Subnet: 10.1.0.0/255.255.0.0
IP Gateway: 10.1.1.254

Press 'Ctrl-Z' to enter configuration mode
```

7. Press Ctrl-z. The emulator command prompt appears:

```
Z8 LXM ICE %
```

Note: The emulator console prompt is not case-sensitive.

8. Type help or ? at the emulator command prompt to see a list of available commands. The following list displays:

```
Commands are:
  ?               bpool           date            debugport
  devs            echo            exit            hang
  help            ifconfig        kill            mem
  password        port            ps              reboot
  restore         sem             sleep           time
eth1 %
```

Command usage is described in Table 3.

Table 3. Crimzon ICE Commands

Command	Description and Options
?	Displays available emulator command shell options.
bpool	Displays buffer pool information.
date	Displays current date.
debugport	Configures the TCP port.Usage: debugport – displays current setting debugport tcp_port – sets debugport to specified TCP port. Example: debugport 4040 sets debugport to TCP port 4040.
devs	not used
echo	Echoes arguments typed into the command line.
exit	Exits the command shell.
hang	not used
help	Displays available emulator command options.
ifconfig	Configures the emulator network interface. Entering ipconfig with no options lists current configuration. The following command options are available: • i – specifies an IP address • s – specifies a subnet mask • g – specifies a network gateway address • dhcp – configures the emulator network interface to look for a dhcp host to obtain network settings Example: ifconfig i 192.168.1.1 s 255.255.255.0 g 192.165.1.254 configures the emulator to use IP address 192.168.1.1 on subnet 255.255.255.0 with gateway address 192.168.1.254. To configure the emulator to use DHCP, enter: ifconfig dhcp on
kill	not used

Table 3. Crimzon ICE Commands

Command	Description and Options
mem	Displays memory usage information.
password	not used
port	Displays port information.
ps	Displays a list of processes running on the ICE by process id number.
reboot	Reboots the emulator.
restore	Restores factory default network interface settings.
sem	Displays semaphore information.
sleep	not used
time	Displays current time and date.

9. When you have finished configuring the emulator, type `exit` to exit the command shell.
10. Exit HyperTerminal.
11. Type `reboot` and press Return or cycle the power on the Crimzon ICE for the new settings to take effect.
12. The hardware is now configured and ready for application development. Proceed to “Running a Sample Project” on page 18.

USB Port Connection

When you first connect the Crimzon ICE to your PC using a USB port, you need to help Windows load the appropriate driver from the ZDS II installation directory or CD-ROM. You can download ZDS II software from www.ZiLOG.com. You need to help Windows locate the driver once only. The procedure depends on your Windows operating system version.

Windows XP:

1. Connect the Crimzon ICE to the host PC for the first time using the supplied USB cable. See Figure 11 for Crimzon ICE back panel connection.

Figure 11. Crimzon ICE Rear Panel

Caution: Ensure the target board is not powered on before proceeding.

2. Connect a 5VDC power supply to the Crimzon ICE. The 3.3VDC and 1.8VDC power LEDs should illuminate (see Figure 11). If either power LED fails to illuminate, or if the ICE Fail LED either blinks continuously or fails to extinguish after 15 seconds (see Figure 12), there is a problem with the unit. Contact ZiLOG support at `http://www.zilog.com` for a replacement unit.

   In Windows, The Found New Hardware Wizard should activate automatically.

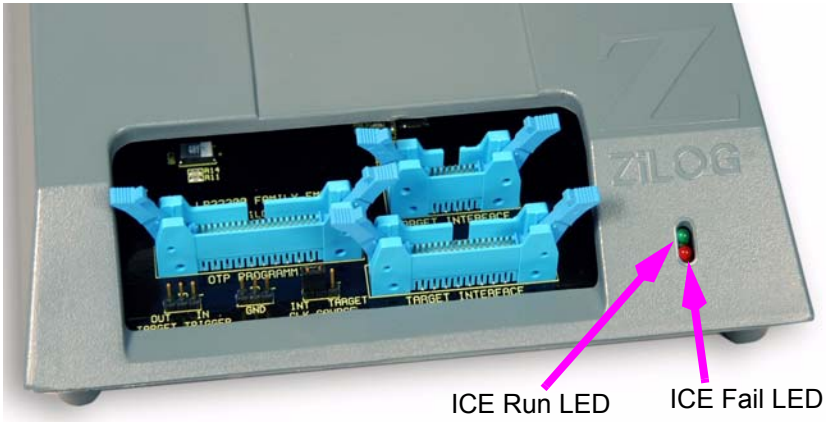

Figure 12. Crimzon ICE Front-Panel

3. In the Wizard, select Install from a list or specific location (Advanced); then click Next.

Note: If the Windows Logo testing dialog appears, select Continue Anyway.

4. Select Search for the best driver in these locations and Include this location in search.
5. Browse to the driver directory, one of the following:

```
<ZDSII Installation Directory>\device drivers\USB
<ZDSII Installation CD>\Device Drivers\USB
```

6. Click Next, and then click Next again after the appropriate driver is found.
7. Click Finish to complete the installation.

Windows 2000:

1. Connect the Crimzon ICE to the host PC for the first time using the supplied USB cable. See Figure 11 for Crimzon ICE back panel connection.

Caution: Ensure the target board is not powered on before proceeding.

2. Connect a 5VDC power supply to the Crimzon ICE. The 3.3VDC and 1.8VDC LEDs should illuminate (see Figure 5). If either power LED fails to illuminate, or if the ICE Fail LED either blinks continuously or fails to extinguish after 15 seconds (see Figure 6), there is a problem with the unit. Contact ZiLOG support at `http://www.zilog.com` for a replacement unit.

   In Windows, The Found New Hardware Wizard should activate automatically.
3. In the Wizard, click Next.
4. Select Search for a suitable driver for my device (Recommended); then click Next.
5. Select Specify a location; then click Next.
6. Browse to the driver directory, one of the following:

```
<ZDSII Installation Directory>\device drivers\USB
<ZDSII Installation CD>\Device Drivers\USB
```

7. Click OK, and then click Next after the appropriate driver is found.
8. Click Finish to complete the installation.

Windows 98SE:

1. Connect the Crimzon ICE to the host PC for the first time using the supplied USB cable. See Figure 11 for Crimzon ICE back panel connection.

Caution: Ensure the target board is not powered on before proceeding.

2. Connect a 5VDC power supply to the Crimzon ICE. The 3.3VDC and 1.8VDC LEDs should illuminate (see Figure 5). If either power LED fails to illuminate, or if the ICE Fail LED either blinks continuously or fails to extinguish after 15 seconds (see Figure 6), there is a problem with the unit. Contact ZiLOG support at `http://www.zilog.com` for a replacement unit.

In Windows, The Found New Hardware Wizard should activate automatically.

3. In the Wizard, click Next.
4. Select Search for the best driver for your device (Recommended); then click Next.
5. Select Specify a location; then browse to the driver directory, one of the following:

```
<ZDSII Installation Directory>\device drivers\USB
<ZDSII Installation CD>\Device Drivers\USB
```

6. Click Next, and then click Next again after the appropriate driver is found.

Click Finish to complete the installation. Proceed to "Running a Sample Project" on page 18.

Running a Sample Project

After installing the ZDS II software and setting up the hardware, you can run a sample software project to verify proper emulator operation and experiment with the trace and event system. This section describes how to run the emulator in in-circuit mode.

Notes: If you run the emulator with a target attached, be aware that the emulator's voltage comparator is designed as a target power sensor, not as a precision voltage measurement device. If you set the Target VCC to match your target and the target's voltage drifts downward, the power sensor may no longer detect it. The emulator may therefore not connect to the target. In such cases, set the Target VCC voltage progressively lower until you get a good connection.

If using the IR development board supplied with the kit, refer to "Technical Information on the IR Development Board" on page 30 for technical details and Table 6 on page 33 for jumper settings.

The sample project `ZLP12840100kit ver 1.zdsproj` is included in the ZDS II sample directory, located in:

```
c:\Program Files\ZiLOG\ZDSII_<product>_<version>
  \samples\<processor type>_<demo name>
```

Start ZDS II for the Crimzon ICE Emulator by opening Start > ZiLOG ZDS II - Crimzon Emulator <*software_version*> and follow the instructions below to run the sample project `ZLP12840100kit ver 1.zdsproj`.

1. Ensure that power is applied to the Crimzon ICE.
2. Apply power to the target board.

3. Open the sample project file: File –> Open Project –> `c:\Program Files\ZiLOG\ZDSII_Crimzon_Emulator_<version>\samples\ZLX12840_IRRemote\src\ZLP12840100kit ver 1.zdsproj`.
4. Double-click `irmain.s` in the Project Files window.
5. Open Project –> Settings.
6. In the General tab, verify the CPU Family field is set to ZLP12840.
7. In the General tab, set the CPU type field to ZLP12840X2828.
8. If you use Ethernet communications between the emulator and the PC:
   a. In the Debugger tab (Figure 13), select ZLP12840 - Crimzon_Emulator_Ethernet and then click the Communication button.
   b. The Ethernet Configure Driver dialog box appears. The IP Address field displays a default IP address, 192.168.1.50. Enter the Crimzon ICE IP address if it has been modified. Leave the Port setting at 4040.
   c. Click OK.
9. If you use USB communications between the emulator and the PC:
   a. In the Debugger tab (Figure 13), select ZLP12840 - Crimzon_Emulator_USB and then click the Communication button.
   b. The USB Configure Driver dialog box appears. The Serial Number field displays a serial number for the USB interface.
   c. Click OK.

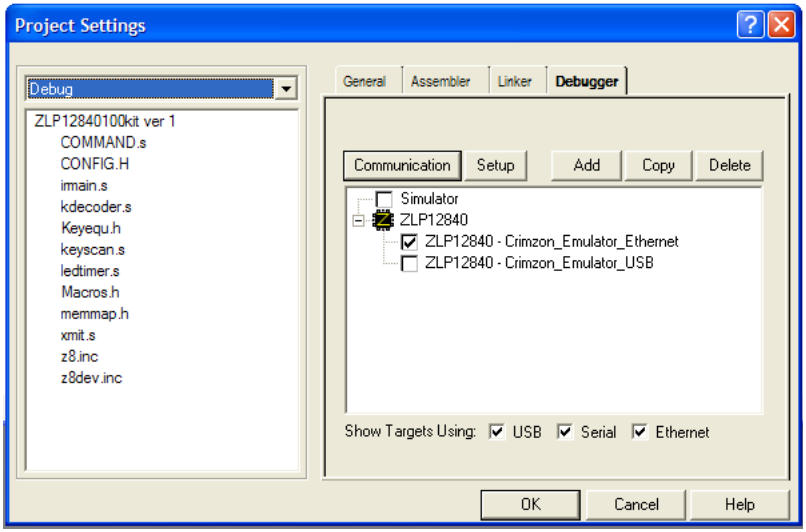

Figure 13. Project Settings, Debugger Tab

10. In the Debugger tab, click the Setup button.

    The Configure Target window appears.

11. Set the Voltage drop-down menu to Standalone if the emulator is not connected to a target.

    If the emulator is connected to a target, select the voltage appropriate for that target.

12. In Clock Source section, select the Internal radio button if the emulator is not connected to a target. Set the Clock Frequency to 7.5MHz.

    If the emulator is connected to a target, select the External radio button.

13. In the Programming Option Bits section, ensure that none of the options are selected.
14. Click OK.
15. Click OK in the Project Settings window.
16. When asked to rebuild affected files, click Yes to rebuild the project. (You can also rebuild later by pressing F7.)
17. Click the Go button ( ) to connect to the target and start debugging.

18. Click the Break button ( ) and then Stop Debugging to exit the debug session.

Note: The following steps describe two ways to use the trace and event system. For details on running the trace and event system, refer to the ZDS II online help and the *ZDS II—Crimzon User Manual* (UM0164), located in the docs directory of the ZDS II CD-ROM.

Collecting a Simple Trace

19. Now we'll collect a simple trace by starting the program, then stopping it and viewing the trace buffer. Click the Go button ( ) in the toolbar, wait a moment, and then press the Break button ( ). The trace buffer acts as a ring buffer that continuously fills and then overwrites itself until you stop execution.
20. Open the Trace window by selecting View > Debug Windows > Trace and then click Get Frames to display the trace information.

Using an Event to Stop Execution

Events allow you to stop execution based on more complex conditions than a simple instruction address.

The following events are available:

- Program counter position, with mask.
- Data on Port0 (state of its pins), with mask.
- Data on Port2 (state of its pins), with mask.
- Data on Port3 (state of its three input pins), with mask.
- External Trigger In (0 or 1).

Let's define a simple event and see how it works.

1. Select Tools --> Trace and Event System. The Trace and Event System window appears (Figure 14).

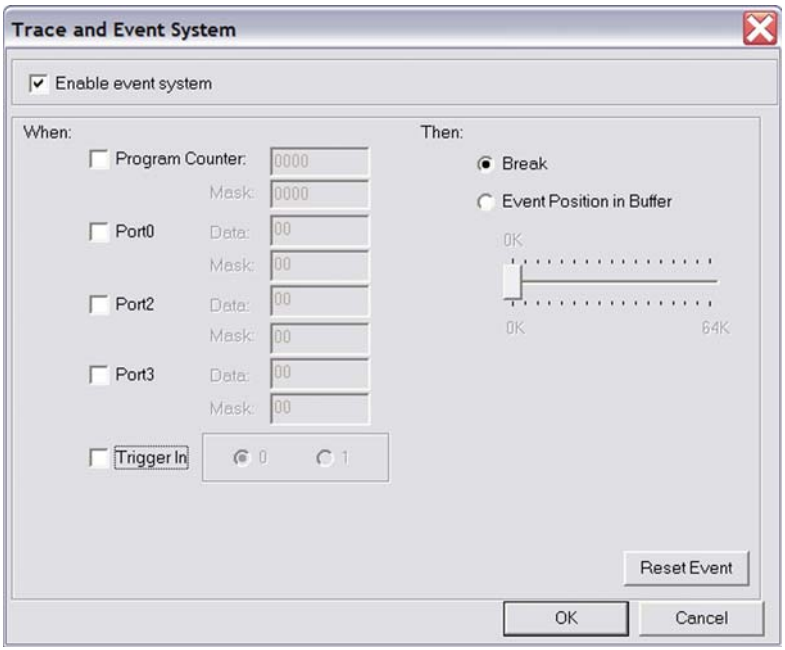

Figure 14. Trace and Event System Window

2. Click the Enable Event System check box and click the Break check box.
3. In the When: section, click the Program counter check box and set the Program Counter to `0044` and the Mask to `FFFF`.
4. Click OK.
5. Open the Trace window by selecting View –> Debug Windows –> Trace.
6. In the Trace window, click the Clear Trace button.
7. Reset the Debugger by clicking the Reset button in the toolbar, or by selecting Build –> Debug –> Reset.
8. Run the Debugger by clicking the Go button or by selecting Build –> Debug –> Go.
9. When the program counter reaches 0044, execution stops on event match.
10. Click Get Frames to display the trace information. Study the contents of the Trace window to see how the trace and event system reports program execution for the segment we set using the Event tools.

Collecting Trace After an Event

You can also use the Trace and Event System to capture trace data after an event. Set up your events as described in "Using an Event to Stop Execution" on page 21. In the Then: section, click the Event Position in Buffer radio button instead of Break. Use the slider to select the number of cycles from the 64K buffer to be captured after the event.

When the event is detected, the selected number of cycles after the event are collected. Execution stops after the cycles are collected. What remains in the trace buffer are the selected number of cycles after the event.

Single-Stepping Through a Program

ZDS II provides a simple mechanism for single-stepping through a program. To single-step through a program:

1. Reset the program to Main() by either the Reset icon or with Build –> Debug –> Reset. Set the Reset to Main option by selecting Tools –> Options. In the Options window, select the Debugger tab and select the Reset to symbol 'main' check box.
2. To step through the program one instruction at a time, use F11 or click the  button in the Debug toolbar (also accessible by selecting Build –> Debug –> Step Into).

Peek/Poke Registers

1. ZDS II makes it easy for you to set and read emulator register contents. With the `ZLP12840100kit ver 1.zdsproj` project open and ZDS II connected to the emulator (target), select View --> Debug Windows –> Registers.
2. In the Registers window, double-click the value of any register and type in a new value.
3. Press Enter. The new value displays in red.

Refer to the *ZDS II – Crimzon User Manual* (UM0164) on the ZDS II CD-ROM and the ZDS II online help for further information on setting and reading register values.

Peek/Poke Memory

4. ZDS II also allow to set and read memory contents. With the `ZLP12840100kit ver 1.zdsproj` project open and ZDS II connected to the emulator (target), select View –> Debug Windows –> Memory.
5. In the Memory window, double-click the value you want to change and type in a new value. (Values begin in the second column after the Address column.)
6. Press Enter. The new value displays in red.

Refer to the *ZDS II User Manual* (UM0164) on the ZDS II CD-ROM and the ZDS II online help for further information on setting, filling, and reading memory.

OTP Programming

Once your program is running properly, use the Crimzon ICE OTP Programming Module to burn your program onto a Crimzon family chip. There are two ways to burn an OTP chip:

- Burn the code in the current ZDS II project from emulator RAM onto the OTP chip.
- Load an existing hex file into emulator RAM and burn it onto the OTP chip.

Note: Do not connect to the emulator when programming windowed CDIP parts. Refer to "Burning Code from an Existing Hex File" on page 26 when programming windowed CDIP parts.

Burning Code from the Current Project

To burn code from the project currently built in ZDS II (loaded in emulator RAM):

1. If you are currently in debugging mode, stop by clicking Build > Debug > Stop Debug or pressing Shift-F5.
2. Connect the OTP programming module to the emulator as described in "Connecting the Crimzon ICE to the OTP Programming Module (Optional)" on page 6.
3. Select the OTP chip you wish to burn and the appropriate package converter.
4. Install the package converter, if used, into the ZIF socket on the OTP programming module.
5. Install the OTP chip you wish to burn into the ZIF socket on the OTP programming adapter. Match pin 1 of the chip with pin one of the ZIF socket.
6. In ZDS II, open the project for the code you wish to burn onto the chip.
7. In ZDS II, connect to the emulator by pressing the Connect to Target () button.
8. Select Tools –> OTP Programming to open the OTP window (Figure 15).

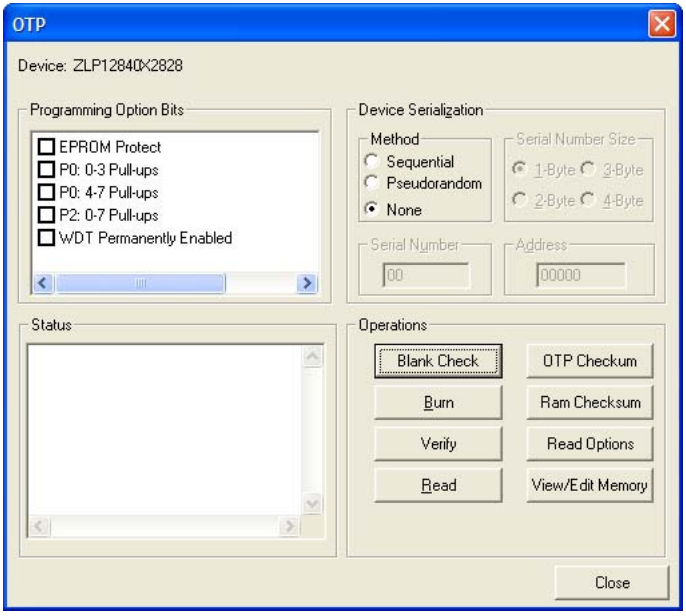

Figure 15. OTP Programming Window (Current ZDS II Project Example)

9. Click the Ram Checksum button to calculate the checksum of the data in emulator RAM. Use this to compare with the OTP checksum after burning.
10. Select which option bits to program in the Programming Option Bits area.
11. If you do not want a serial number loaded into the part, select the None button in the Method area. To load a serial number:
    a. Select the Sequential or Pseudorandom button to determine how the serial number is incremented on subsequent burns.
    b. Select the size of the serial number (1, 2, 3, or 4 bytes) in the Serial Number Size area.
    c. Enter the starting serial number in the Serial Number field.
    d. Enter the address into which you want the serial number loaded in the Address field.
12. Click Blank Check to verify that the OTP chip is actually blank.
13. Click the Burn button to program the OTP chip with the contents of emulator RAM. As part of the Burn function, the OTP chip is also verified.

14. When the burn is complete, click OTP checksum to calculate the checksum of data on the OTP chip and compare it to the RAM checksum calculated earlier.
15. Click Close to close the OTP Programming window.

Burning Code from an Existing Hex File

To load an existing hex file into emulator RAM and burn an OTP:

1. Connect the OTP programming module to the emulator as described in “Connecting the Crimzon ICE to the OTP Programming Module (Optional)” on page 6.
2. Select the OTP chip you wish to burn and the appropriate package converter.
3. Install the package converter, if used, into the ZIF socket on the OTP programming module.
4. Install the OTP chip you wish to burn into the ZIF socket on the OTP programming adapter. Match pin 1 of the chip with pin one of the ZIF socket.
5. Stop any current debugging process by selecting Build --> Debug --> Stop Debugging.
6. In ZDS II, open the project for the code you wish to burn onto the chip.
7. Select Tools --> OTP Programming to open the OTP window (Figure 16).

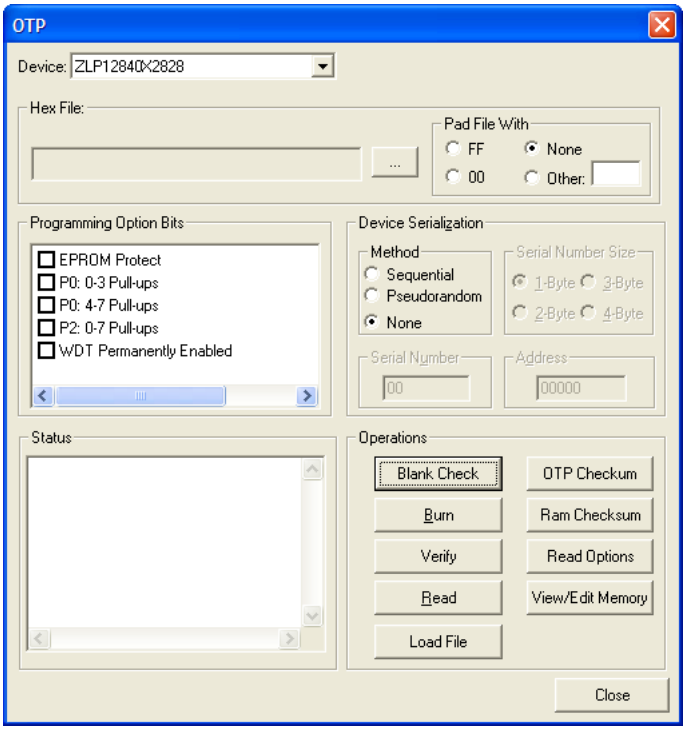

Figure 16. OTP Programming Window (Hex File Example)

8. If the appropriate target device is not selected, set it now in the Device drop-down menu.
9. In the Hex File: section, click the ... button and select the hex file you wish to burn into the OTP chip.
10. If you do not want to pad the hex file, select the None button in the Pad File With area. Otherwise, select the FF, 00, or Other button. If you select the Other button, type the hex value to pad the hex file with in the Other field.
11. Click the Load File button to load the hex file into emulator RAM.
12. Click the Ram Checksum button to calculate the checksum of the data in emulator RAM. Use this to compare with the OTP checksum after burning.
13. Select which option bits to program in the Programming Option Bits area.

14. If you do not want a serial number loaded into the part, select the None button in the Method area. To load a serial number:
    a. Select the Sequential or Pseudorandom button to determine how the serial number is incremented on subsequent burns.
    b. Select the size of the serial number (1, 2, 3, or 4 bytes) in the Serial Number Size area.
    c. Enter the starting serial number in the Serial Number field.
    d. Enter the address into which you want the serial number loaded in the Address field.
15. Click Blank Check to verify that the OTP chip is actually blank.
16. Click the Burn button to program the OTP chip with the contents of emulator RAM. As part of the Burn function, the OTP chip is also verified.
17. When the burn is complete, click OTP checksum to calculate the checksum of data on the OTP chip and compare it to the RAM checksum calculated earlier.
18. Click Close to close the OTP Programming window.

LED Indicators

There are three sets of dual LED indicators on the Crimzon ICE (see Figures 5 and 6):

- The dual ICE RUN LED on the front panel indicates emulator status. If the top LED is lit, the emulator is executing your system code. When the top LED is off, emulation has stopped. If the bottom LED is lit, the emulator is not functioning properly. Contact technical support at `http://www.zilog.com` for assistance.
- The dual 3.3VDC/1.8VDC LED on the rear panel indicates the status of internal voltages. Both LEDs are normally illuminated when power is connected.
- The dual LAN/LINK LED on the rear panel indicates Ethernet status. The LINK LED indicates that the Ethernet connection is live. The LAN LED indicates that data is being transferred across the connected network.

External Interface Connectors

There are five external interface connectors on the Crimzon ICE. Connectors P9 and P10 are used to connect the emulator to the target Pod and adapter board assembly. (See Figure 1.)

The OTP Programming connector P8 is used to connect the emulator to the OTP programming module.

Connector J4 on the emulator front panel (see Figures 1 and 6) provides a ground connection on all three pins.

Connector J5 on the emulator front panel (see Figures 1 and 6) provides access to the following functions:

- Pin 3 provides a HIGH external trigger out for use in triggering a device such as a logic analyzer or oscilloscope. Pin 3 is under software control, and can be set to activate through the ZDS II trace and event system. The trigger can be set to toggle or pulse.
- Pin 1 provides an input for an external HIGH or LOW trigger in, allowing use of an external trigger as an event for the ZDS II trace and event system.

Using J5 Pin 3, External Trigger Out

The Crimzon ICE external trigger out feature is always enabled. Set your trace and event system parameters, then run your code. When the event you set up occurs, pin 3 of connector J5 goes HIGH and stays HIGH as long as the event is active. The bigger the event window, the longer trigger out stays HIGH.

How to Set Connector J5 Pin 1, External Trigger In (see Figure 6 on page 8)

To use the Crimzon ICE external trigger in feature:

1. With the `ZLP12840100kit ver 1.zdsproj` project open in ZDS II as described in "Running a Sample Project" on page 18, select Tools > Trace and Event System.
2. In the Trace and Event System window, select an Event entry. In the When section, check the Trigger In box.
3. Select either 0 or 1 to trigger on trigger low or high, respectively (edge-triggering not supported).
4. Click the OK button to set the trace and event system parameters. If you set trigger=1 in the Trace and Event System window, then a HIGH on pin 1 of connector J5 generates an event in the ZDS II trace and event system. If you set trigger=0, then a LOW on pin 1 of connector J5 generates an event.

Crimzon Package Support and Ordering Information

The Crimzon ICE supports the packages listed in Table 4.

Table 4. Crimzon Package Support

Chip Package	For OTP Programming order:	For In-Circuit Emulation, order:
20 PDIP	Included in ZLP128ICE01ZEM kit	Included in ZLP128ICE01ZEM kit
20 SOIC	Included in ZLP128ICE01ZEM kit	20-PDIP to 20-SOIC adapter from Ironwood, P/N SOIC20-02
20 SSOP	Included in ZLP128ICE01ZEM kit	20-PDIP to 20-SSOP adapter from Ironwood, P/N SOIC20-09
28 PDIP	Included in ZLP128ICE01ZEM kit	Included in ZLP128ICE01ZEM kit
28 SOIC	Included in ZLP128ICE01ZEM kit	Included in ZLP128ICE01ZEM kit
28 SSOP	Included in ZLP128ICE01ZEM kit	Included in ZLP128ICE01ZEM kit
40 PDIP	Included in ZLP128ICE01ZEM kit	ZLP323ICE01ZAC
48 SSOP	ZLP323ICE01ZAC	ZLP323ICE01ZAC

Note: 20 SOIC and 20 SSOP adapters are available from Ironwood at http://www.ironwoodelectronics.com/.

Technical Information on the IR Development Board

The IR development board shipped with the Crimzon ICE provides a universal remote control development platform for ZiLOG's ZLP12840 and ZLP32300 families of IR microcontrollers. The board supports both 20- and 28-pin PDIP devices without adapters. The adapters and converters described in Table 4 provide support for other Crimzon family package types.

Schematics for the IR development board are appended to this publication.

IR Development Board Operation

Three-digit codesets enable the IR development board to be used as a remote controller for a variety of devices. Codeset tables are available from ZiLOG customer support (www.ZiLOG.com).

Applying Power to the Board

Insert the two AA batteries supplied with the kit into the battery holder on the bottom of the IR development board and set the Battery Power switch to the ON position.

You can also apply an external 3.0VDC power supply to the board between terminals J7 (Vbat) and J8 (Gnd). (The board supports a voltage range of 2.0VDC to 3.6VDC. Match your ZDS II project settings to ensure proper operation.)

Enabling the Universal Remote Control Feature

Use the following procedures to enable a universal remote control:

1. Changing a device (device can be TV, VCR, CABLE, SAT and so forth):

   Press and release any device key (for example, a TV, VCR, CABLE or AUX1).
2. Changing a code (CODE is the three-digit number for the code selected from Tables 8 through 11):

   Press and hold the device key for three seconds. LED D2 stays ON for three seconds and then turns off.
3. Release the device key. LED D2 is ON.
4. Press and release the three digit keys one by one. LED D2 stays OFF when pressing a key and ON when the key is released.
5. LED D2 turns OFF if the three-digit code is accepted. If the number is rejected or is invalid, LED D2 blinks quickly eight times. Try reentering the code number.

Key Matrix

The IR development platform key matrix has eight rows and columns with two alternate configurations. The default configuration uses the eight port 2 (input) pins as column signals for key press detection and the eight port 0 (output) pins as row signals for the key scanning signal. This configuration provides 64 keys.

The key matrix is shown in Table 5. See Figure 2 for key locations.

Table 5. IR Development Board Key Matrix

K1 SUR MODE	K2 TT HOLD SUR ON	K3 YELLOW FRONT	K4 RED CENTER	K5 GREEN REAR	K6 BLUE DELAY	K7 TT OFF DELAY UP	K8 TT ON DELAY DN
K9 DISC	K10 TAPE	K11 TUNER	K12 TELEVISIO N	K13 VIDEO 1	K14 VIDEO 2	K15 AUDIO	K16 TEST
K17 UP ARROW	K18 DOWN ARROW	K19 LEFT ARROW	K20 RIGHT ARROW	K21 DSP_MODE	K22 DSP_ON	K23 PIP	K24 SWAP

Table 5. IR Development Board Key Matrix

K25	K26 REC	K27 STOP	K28 PLAY	K29 PAUSE	K30 REW	K31 FF	K32 AV
K33 TV	K34 SAT	K35 DVD	K36 1	K37 2	K38 3	K39	K30 CH+
K41 VCR	K42 AMP	K43 AUX	K44 4	K45 5	K46 6	K47 GUIDE	K48 CH-
K49 CABLE	K50 CD	K51 INFO	K52 7	K53 8	K54 9	K55 RECALL	K56 VOL+
K57 POWER	K58 MUTE	K59 MENU	K60 EXIT	K61 0	K62 ENTER	K63 SELECT	K64 VOL-

Learning Circuit

The learning circuit on the ZLP12840/ZLP32300 IR development platform consists of the following components:

- Photo detector D1
- Off-chip IR amplifier Q2, Q3 with related resistors, used only with LP32300 part
- Setup jumpers J2 and J9

When using the ZLP12840 the internal, on-chip, IR amplifier is used to amplify the signal from D1. When using the ZLP32300 part is used the off-chip amplifier Q2, Q3 is used for this purpose.

Jumper and Switch Settings

The jumpers on the IR development board supplied with the Crimzon ICE function as follows:

- J1 – Future use, for factory testing.
- J2 – Selects device type (ZLP12840 or ZLP32300).
- J3, J4, …, J8 – Test points
- J9 pins 1-2 – Selects whether external IR amplifier is being enabled by P37, or P37 is used as SCLK.
- J9 3-4 – Connects P37 to U1.6 (SCLK).
- J9 5-6 – Connects P27 to U1.5 (SDA).
- J10 – Connects P2 pins to the columns of the keypad.
- J11 – Connects P0 to the rows of the keypad.

- J12 – Selects whether LEDs on/off are being controlled by P34.
- J13 – Selects whether CTS and RTS signals on the RS232 interface are being shorted. Some communication software requires those signal to be shorted.
- J14 – Enables/disables RS232 interface.

Factory settings for IR development board jumpers are described in Table 6.

Table 6. Default Jumper Settings, IR Development Board

Jumper	Description	Pins	Configuration	Default Setting
J2	IR Amplifier	1-2	Connect external IR Amplifier	OUT (for ZLP12840)
J2	IR Amplifier	3-4	IN for direct IR photodiode connection	IN (for ZLP12840)
J2	IR Amplifier	5-6	Connect external IR amplifier	OUT (for ZLP12840)
J9	IR Amplifier	1-2	IN to allow P37 to enable external IR Amplifier	OUT (for ZLP12840)
J9	I2C Interface	3-4	IN to connect P37 to SCLK of EEPROM	IN
J9	I2C Interface	5-6	IN to connect P27 to SDA of EEPROM	IN
J10	All Keypad	1-16	Connect keypad column 0 – 7 to P20 – P27	IN
J11	All Keypad	1-16	Connect keypad row 0 – 7 to P00 – P07	IN
J13	RTS-CTS	1-2	Connect RTS and CTS	OUT
J14	RS232_EN	1-2	IN to enable Rx OUT to disable Rx (tri-state)	OUT
J14	RS232_SHDN	3-4	IN to disable Tx (tri-state) OUT to enable Tx	IN

There are four eight-position DIP switches on the IR development board. Their functions are described in Table 7.

Table 7. IR Development Board DIP Switch Settings

Switch	Description
SW2	Controls the connection of eight LEDs to port 0 when it is configured as output. Default = all OFF
SW3	Controls the pull-up resistors for Port 0. Default = all OFF
SW4	Controls the pull-up resistors for Port 2. Default = all OFF
SW5	Controls the pull-up resistors for Port 3. Default = all ON

Codesets

Three-digit codesets for the IR development board are listed in Tables 8 through 11.

Table 8. Television Brands

Brand	Zilog Code Numbers
Admiral	116 234
Adventura	235
Aiko	126
Akai	63 91 117
Alba	33
Alleron	151
A-Mark	29
Amstrad	90
Amtron	145
Anam	28 29 83 105 145
Anam National	248 249 269
AOC	14 29 99 108 109 118 119 120 251
Archer	29
Audiovox	29 145
Bauer	35
Belcor	118
Bell & Howell	116 183 230
Bradford	145
Brockwood	14 118
Candle	14 95 97 98 108 118 120 121 235
Capehart	14
Celebrity	117
Circuit City	14
Citizen	18 94 95 96 97 98 101 108 118 120 121 126 145 199 235 236
Colortyme	14 118 120 122 254
Concerto	97 118 120

Table 8. Television Brands

Brand	Zilog Code Numbers
Contec	49 83
Contec/Cony	123 124 145
Craig	15 83 145
Crown	94 145
Curtis Mathes	94 101 108 115 118 120 125 199 230
CXC	83 145
Daewoo	2 91 92 94 109 118 119 120 126 127 213 214 256
Daytron	14 118 120
Dimensia	115
Dixi	29 52 91
Dumont	14 118
Electroband	117
Electrohome	3 5 94 118 120 128 129 130 269
Elta	91
Emerson	1 12 14 83 84 85 86 87 88 89 90 94 118 120 123 131 132
	133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149
	150 151 152 211 230 236 237 260 270
Envision	108 118 120
Etron	91
Fisher	50 82 153 154 155 230
Formenti	35
Fortress	39
Fujitsu	15 89 151
Funai	15 83 89 145 151
Futuretec	145
Futuretech	15 83
GE	14 20 80 81 84 102 105 106 111 115 118 120 130 156 187 231 232
	239 269
Genexxa	33
Gibralter	118

Table 8. Television Brands

Brand	Zilog Code Numbers
Goldstar	14 52 78 79 94 97 109 118 119 120 123 128 129 159 160 161 228
Granada	3 14
Grand	14
Grandiente	3
Grundy	145 151
Hallmark	14 118 120
Harvard	145
Hinari	89
Hitachi	3 10 24 71 72 73 74 75 76 77 94 97 118 120 123 124 163
	164 218 221 222 223 224 237 253
Hitachi Pay TV	273
IMA	145
Infinity	64 165
Janeil	235
JBL	64 165
JC Penney	46 81 94 101 108 109 111 115 118 119 120 121 130 156 161 166 167
	174 187 199 239 255
JCB	117
Jensen	70 118 120
JVC	66 67 68 69 123 124 163 168 169 229 240
Kawasho	65 117 118 120
Kenwood	108 118 120 128 129
Kloss	36 98 235
Kloss Novabeam	170 171 241
KTV	83 84 85 94 145 172 236
Lloyds	14
Loewe	165
Logik	183 266
Luxman	97 118 120
LXI	25 30 47 50 64 111 115 120 153 165 173 174 175 230 239

Table 8. Television Brands

Brand	Zilog Code Numbers																
Magnavox	4	36	64	95	99	108	118	120	121	128	165	170	171	176	177	178	184
	188	215	216	217	241	267											
Majestic	183																
Marants	165	52	64	108	118	120	165	179									
Matsui	91																
Megatron	14	120															
Memorex	14	50	91	116	120	182	183	230	266								
MGA	14	62	108	109	110	118	119	120	128	129	130	155	180	182			
Midland	239																
Minutz	156																
Mitsubishi	7	14	27	61	62	63	109	110	118	119	120	128	129	130	155	180	181
	182	212															
Motorola	234	269															
MTC	14	97	101	108	109	118	119	120	199								
Multitech	145																
NAD	14	30	112	120	173	174	243										
National	13	105	13														
NEC	23	97	100	107	108	109	118	119	120	129	185	254	269				
Nikkai	33	34															
Nikko	14	120	126														
Normande	0																
NTC	126																
Onwa	83	145															
Optimus	243																
Optonica	37	39	192	234													
Orion	15	142	260														
Osaki	34																
Panasonic	6	11	12	13	60	64	104	105	106	165	263	265	269				
Philco	36	95	108	109	118	119	120	121	123	128	165	170	171	176	178	184	241

Table 8. Television Brands

Brand	Zilog Code Numbers																
	267	269															
Philips	52	64	118	121	123	128	165	170	171	177	186	187	188	269	176		
Pilot	118																
Pioneer	59	77	112	118	120	189	190	237	243	264							
Portland	94	109	118	119	120 126												
Price Club	199																
Proscan	111	115	239														
Proton	14	26	94	103	120	123	191	244	118								
Pulsar	113	118															
Quasar	11	105	106	172	263	269											
Radio Shack	34	37	83	94	115	118	120	123	145	153	192	230					
RCA	16	17	25	53	54	55	56	57	58	77	102	109	111	115	118	119	120
	128	193	194	196	197	239	245	256	269	273	274						
Realistic	50	118	120	123	145	153	192	230									
Saisho	90	91															
Sampo	108	118	120														
Samsung	0	8	14	34	52	91	94	97	101	108	109	118	119	120	123	125	127
	128	129	198	255													
Sansui	260																
Sansung	199																
Sanyo	49	50	51	82	118	153	154	180	200	230							
SBR	52																
Schneider	52																
Scotch	120																
Scott	83	87	89	94	118	120	123	132	142	145	151						
Sears	9	14	30	40	41	42	43	44	45	46	47	50	51	82	89	97	111
	118	120	124	128	129	151	153	154	155	169	173	174	201	202	230	239	
Seimitsu	14																
Sharp	21	22	37	38	39	49	94	118	120	123	137	192	203	205	210	234	

Table 8. Television Brands

Brand	Zilog Code Numbers
Shogun	118
Siemens	49
Signature	116 183 266
Simpson	121
Sony	114 117 259 268 272
Soundesign	14 83 95 118 120 121 145 151
Spectricon	29 99
Squareview	15
SSS	83 109 118 145
Starlite	145
Supra	97
Supre-Macy	98 235
Supreme	117
Sylvania	35 36 64 95 108 118 120 121 128 165 170 171 176 177 178 188 207
	241 267 184
Symphonic	15 145 270
Tandy	33 39 234
Tatung	105 237 269
Technics	106
Techwood	97 118 120 157
Teknika	31 32 83 89 94 95 96 97 98 101 109 110 118 119 120 121 123
	124 126 145 151 177 182 183 199 266
Teletech	91
Tera	103 244
Thomas	14
Thompson	5
TMK	14 97 118 120
Toshiba	19 30 46 50 101 153 173 174 199 201 230 255
Totevision	94
Toyomenko	14

Table 8. Television Brands

Brand	Zilog Code Numbers
Universal	81 156 187
Vector Research	108
Victor	69 169 240
Video Concepts	63
Vidtech	14 109 118 119 120
Viking	98 235
Wards	37 81 89 102 108 109 116 118 119 120 128 132 151 156 156 165 170
	171 176 177 183 184 187 188 192 208 209 266 267 268 270
Yamaha	108 109 119 120 128 129
York	14
Zenith	113 118 183 226 227 261 266 271
Zonda	29

Table 9. VCR Brands

Brand	Zilog Code Numbers
Admiral	154
Aiko	169
Aiwa	21
Akai	75 76 77 136 137 138 139 140 156 157 141 155
Alba	115
Amstrad	21
ASA	101
Asha	160
Audio Dynamics	12
Audio Dynamics	158
Audiovox	161
Beaumark	160
Broksonic	159
Broksonic	167

Table 9. VCR Brands

Brand	Zilog Code Numbers
Bush	20
Calix	161
Candle	17 160 161 162 163
Canon	108 117
Capehart	115 116
Capeheart	74 164
Carver	36
CCE	35 169
Citizen	17 18 160 161 162 163 169
Colt	35
Craig	5 18 35 160 161 165
Curtis Mathes	8 17 78 108 153 163 166 160
Cybernex	160
Daewoo	74 114 115 123 167 169 170 162
Daytron	74 115
DBX	12 158
Dumont	112
Dynatech	21
Electrohome	4 161 171
Electrophonic	161
Emerson	4 19 21 23 38 77 79 142 143 144 145 146 147 159 161 162 166 167
	171 173 174 175 176 177 178 179 180
Fisher	3 5 21 25 26 28 29 80 86 112 113 165
GE	8 18 30 52 78 108 109 110 111 153 160
Go Video	106 107
Goldstar	2 17 31 126 161
Goodmans	20
Gradiente	168
Grundig	101
Harley Davidson	168

Table 9. VCR Brands

Brand	Zilog Code Numbers
Harman Kardon	98 126
Harwood	35
Hinari	20
Hi-Q	165
Hitachi	15 16 21 32 33 72 75 118 119 120 121 122
JC Penney	11 12 18 72 80 108 126 158 160 161
Jensen	32 75
JVC	11 12 17 75 82 102 103 104 105 158
Kenwood	11 12 17 75 82 89 104 158 163
KLH	35
Kodak	161
Lloyd	21 168
Logik	20 35
LXI	161
M. Wards	4 5 6 18 19 20 21 108 129
Magnavox	36 37 101 108 129
Magnin	160
Marantz	10 11 12 17 36 101 108 158 163
Marta	161
MEI	108
Memorex	5 21 89 100 108 112 124 154 160 161 165 168
MGA	4 38 77 99 171
MGN Technology	160
Midland	30
Minolta	32 72
Mitsubishi	4 32 38 39 40 41 42 44 45 46 47 71 77 82 97 98 99 104
	171
Motorola	154
MTC	21 160 168
Mukltitech	160

Table 9. VCR Brands

Brand	Zilog Code Numbers
Multitech	30 35 163 168 18 20 21
NAD	96
NEC	9 10 11 12 13 17 49 50 51 75 82 104 125 126 158
Nikko	161
Noblex	160
Optimus	154 161
Optonica	65
Panasonic	1 14 73 108 130 132 133 134 135
Pentax	17 32 72 121 163
Perdio	21
Philco	36 37 108
Philips	65 101 108 181 36
Pilot	161
Pioneer	12 32 52 53 82 93 94 95 96 104 158
Portland	74 115 163
Proscan	8 52 129 153
Protec	35
Pulsar	124
Quartz	89
Quasar	91 92 108
Radio Shack	3 4 5 6 26 65 154 160 161 165 168 171
Radix	161
Randex	161
RCA	0 7 8 18 32 52 54 55 56 57 60 61 62 72 78 121 127 128
	129 130 131 153 155 160
Realistic	21 26 65 86 89 108 112 154 160 161 165 168 171
Ricoh	150
Saisho	145 146
Salora	89 99
Samsung	18 30 76 90 110 123 138 156 160 162 174

Table 9. VCR Brands

Brand	Zilog Code Numbers
Sanky	154
Sansui	12 63 75 82 104 125 158
Sanyo	5 87 88 89 112 160 165
SBR	101
Schneider	20
Scott	19 38 64 144 159 162 167 173
Sears	3 5 25 26 28 32 72 80 86 89 112 113 161 165
Sentra	115
Sharp	4 6 65 65 171
Shintom	20 35
Shogun	160
Singer	35
Sony	148 149 150 151 152
STS	72
Sylvania	21 36 37 38 99 108 168
Symphonic	21 168
Tandy	21
Tashiko	21 161
Tatung	11 75 85
Teac	11 21 56 75 168
Technics	73 108
Teknika	21 22 67 108 161 168
TMK	146 160 166
Toshiba	19 26 28 32 38 64 99 123 162
Totevision	18 160 161
Unitech	160
Vector Research	12 126 158 162 163
Victor	12 104 105 158
Video Concepts	12 77 158 162 163
Videosonic	18 160

Table 9. VCR Brands

Brand	Zilog Code Numbers
Wards	32 35 48 65 68 69 70 72 154 160 161 162 165 168 171
XR-1000	35 168
Yamaha	11 12 17 75 126 158
Zenith	124 151 152

Table 10. Cable Brands

Brand	Zilog Code Numbers
ABC	7 8 9 10
Archer	11 12
Century	12
Citizen	12
Colour Voice	13 14
Comtronic	15
Eastern	16
Garrard	12
Hytex	7
Jasco	12
Jerrold	5 17 18 30 9 10
Magnavox	19
Movie Time	20
NSC	20
Oak	0 21 7
Panasonic	1 6
Philips	24 12 13 14 19
Pioneer	2 3 25
RCA	34
Regency	16
Samsung	26 15
Scientific Atlanta	3 4 27 28

Table 10. Cable Brands

Brand	Zilog Code Numbers
Signal	15
SL Marx	15
Starcom	10
Stargate	15
Teleview	15
Tocom	8 17
TV86	20
Unika	12
United Artists	7
Universal	12 11
Viewstar	20 19
Zenith	3 32 33

Table 11. Satellite Brands

Brand	Zilog Code Numbers
Alphastar	19
Chaparral	0 1
Cheyenne	1
Dishnet	18
Drake	2
Drake	3
Echostar Dish	27
GE	13 20 21
General Instruments	4 5 6
Hitachi	23 24
Hughes Network	17 28
JVC	22
Magnavox	25

Table 11. Satellite Brands

Brand	Zilog Code Numbers			
Philips	25			
Primestar	16			
Proscan	20	21	13	
RCA	13	20	21	
Realistic	7			
Sierra	1			
Sony	14			
STS	8	9	10	11
Toshiba	12	15		
Uniden	26			

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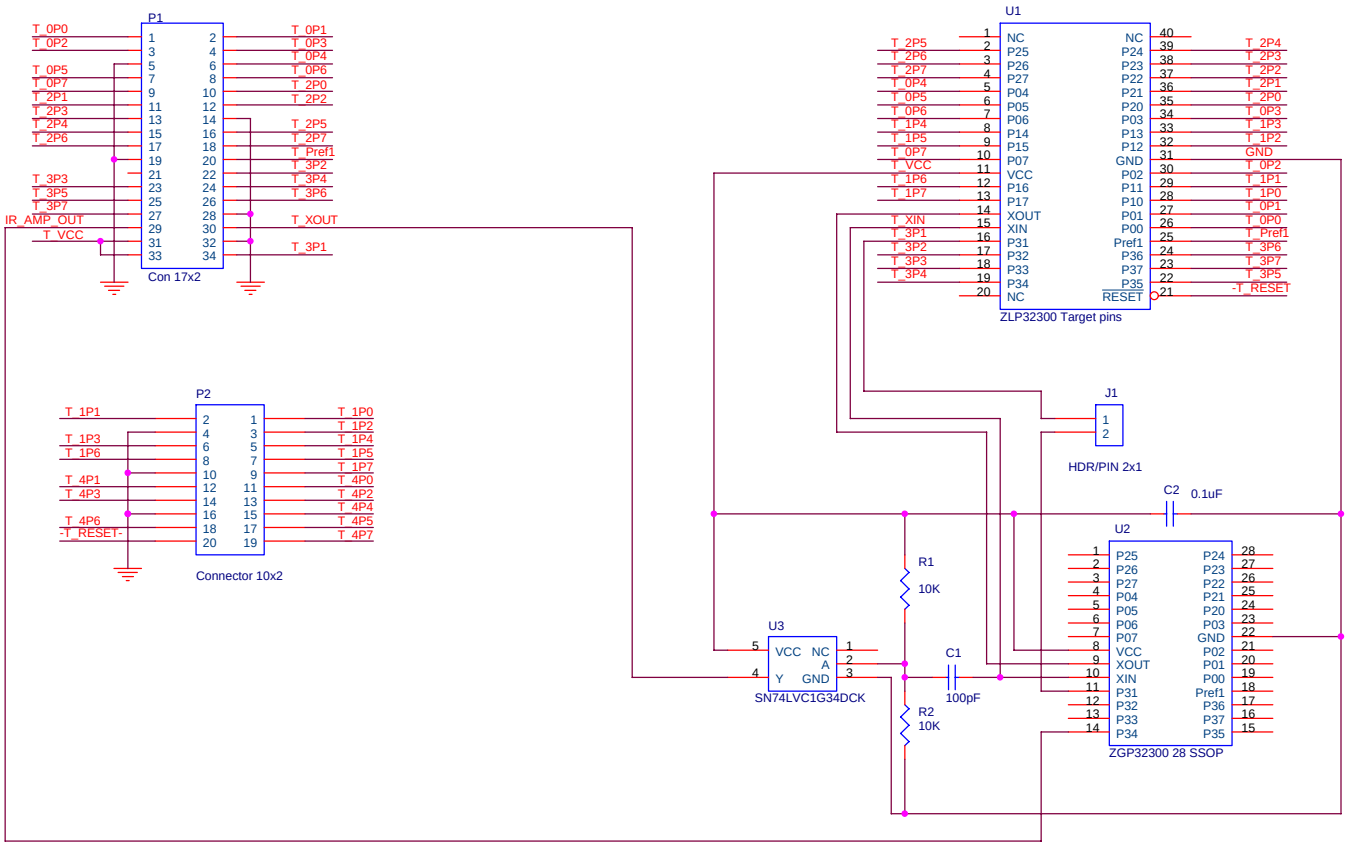

ZiLOG, Inc. 532 Race Street San Jose, CA 95126		
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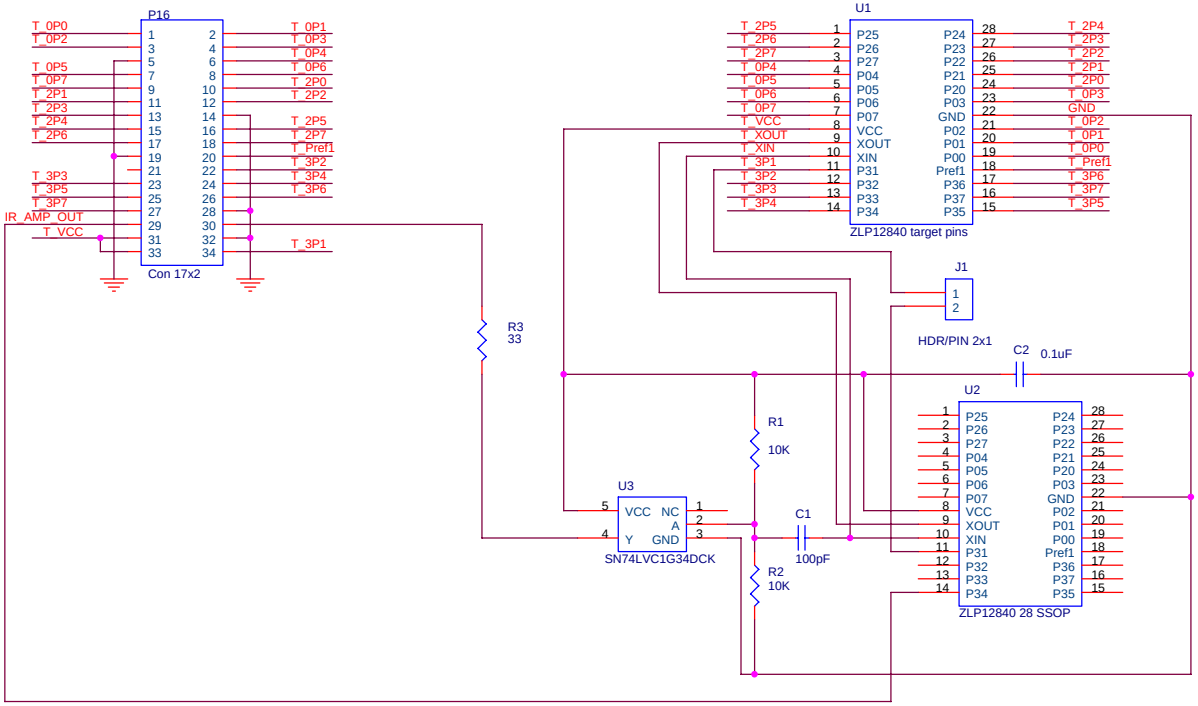
Size: B	Document Number: 96C0996-001	Rev: C
Date: Friday, February 03, 2006	Sheet 1 of 1	



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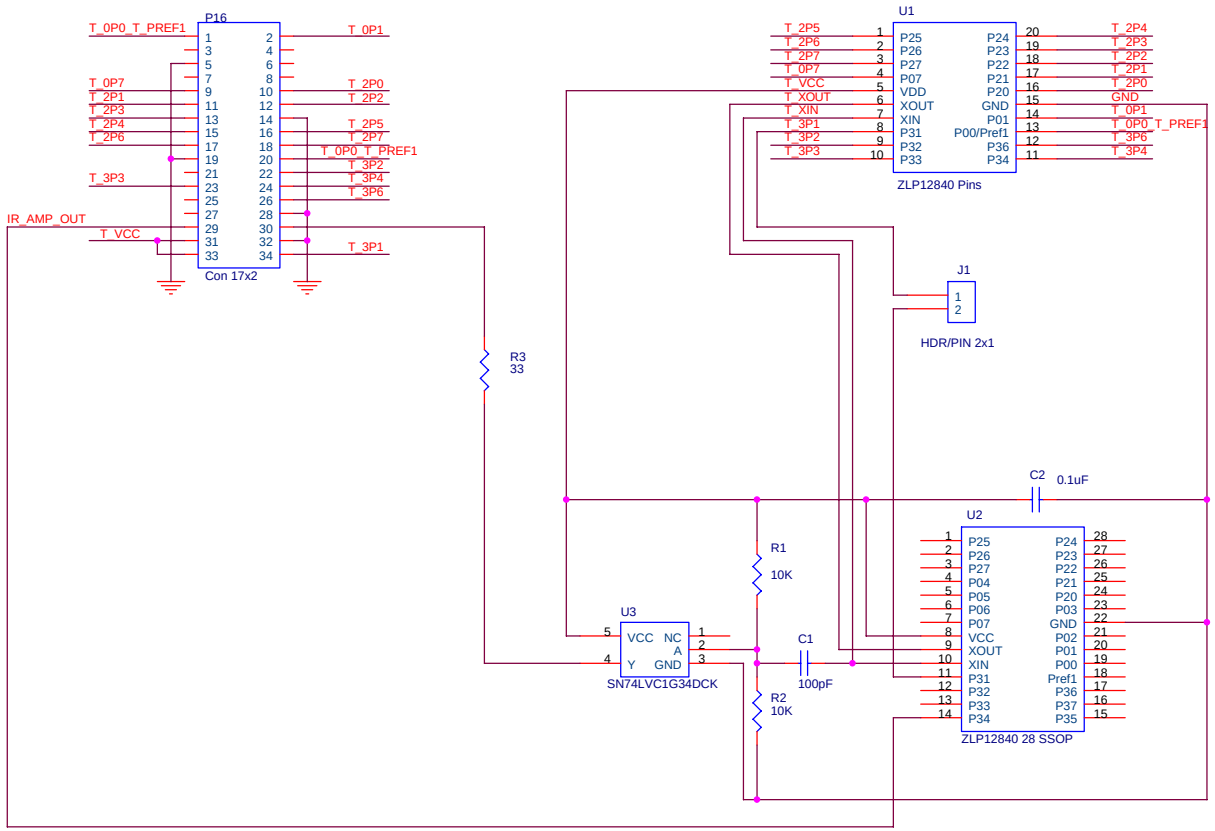
Size: B	Document Number: 96C0970-001	Rev: C
Date: Friday, February 03, 2006	Sheet 1 of 1	



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532 Race Street San Jose, CA 95126	
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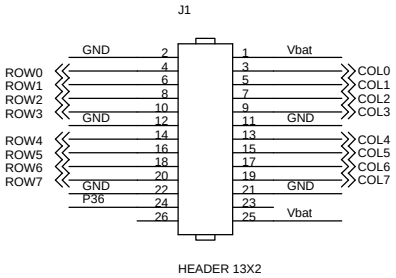
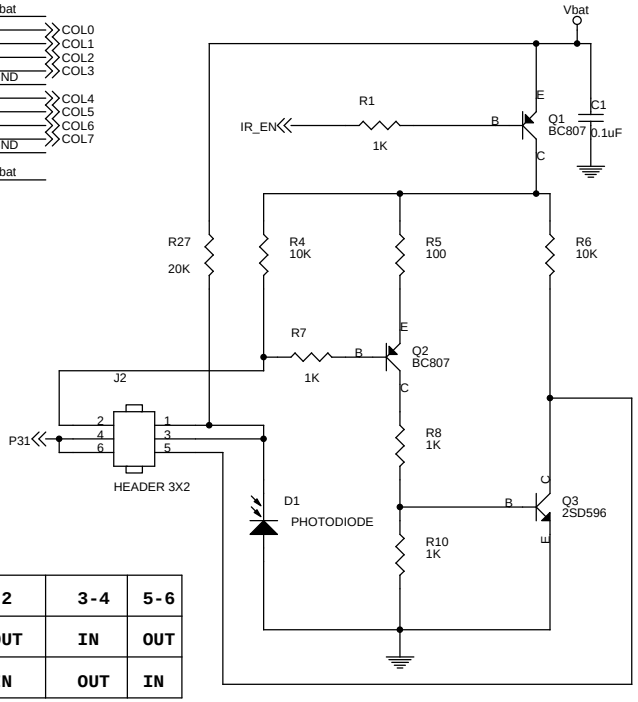
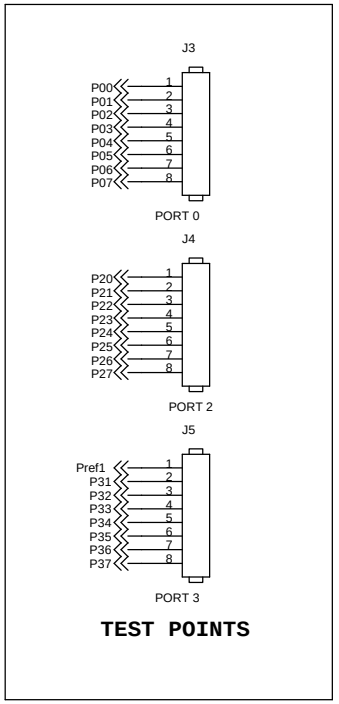
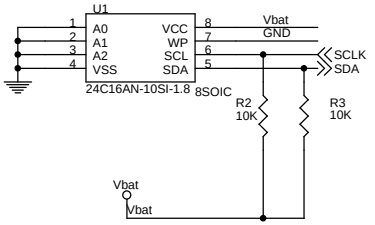
Date: Friday, February 03, 2006	Sheet 1 of 1

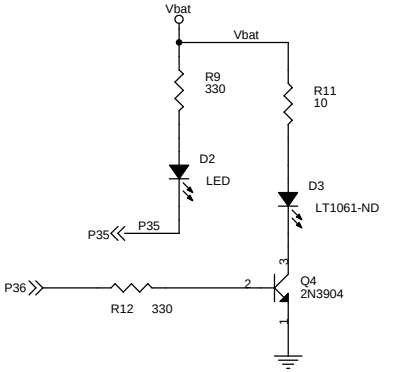


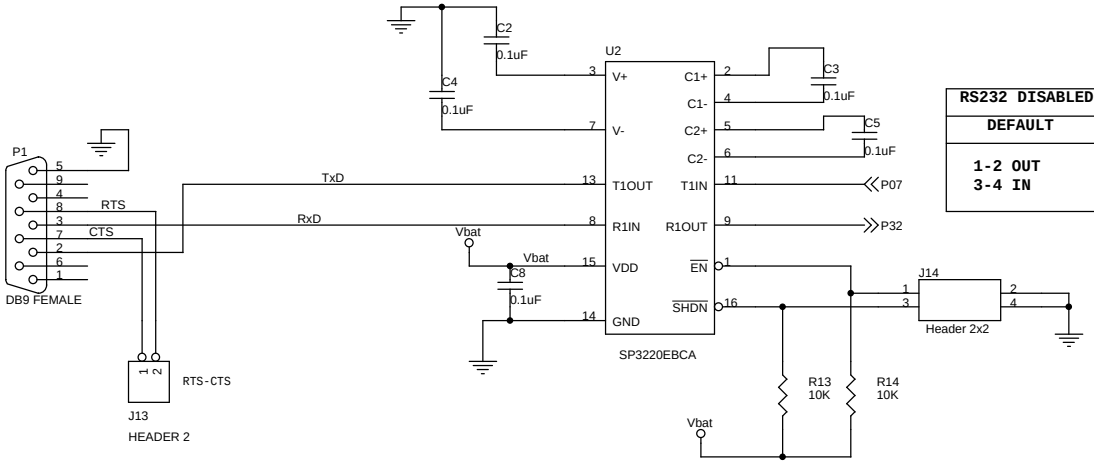


MCU\ PIN	1-2	3-4	5-6
ZLP12840(default)	OUT	IN	OUT
ZLP32300	IN	OUT	IN

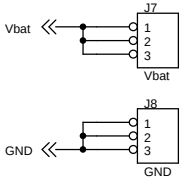


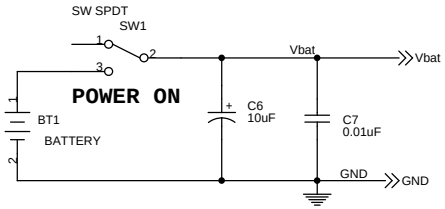






RS232 DISABLED	RS232 ENABLED
DEFAULT	
1-2 OUT 3-4 IN	1-2 IN 3-4 OUT





ZiLOG, Inc.

532 Race Street
San Jose, CA 95126

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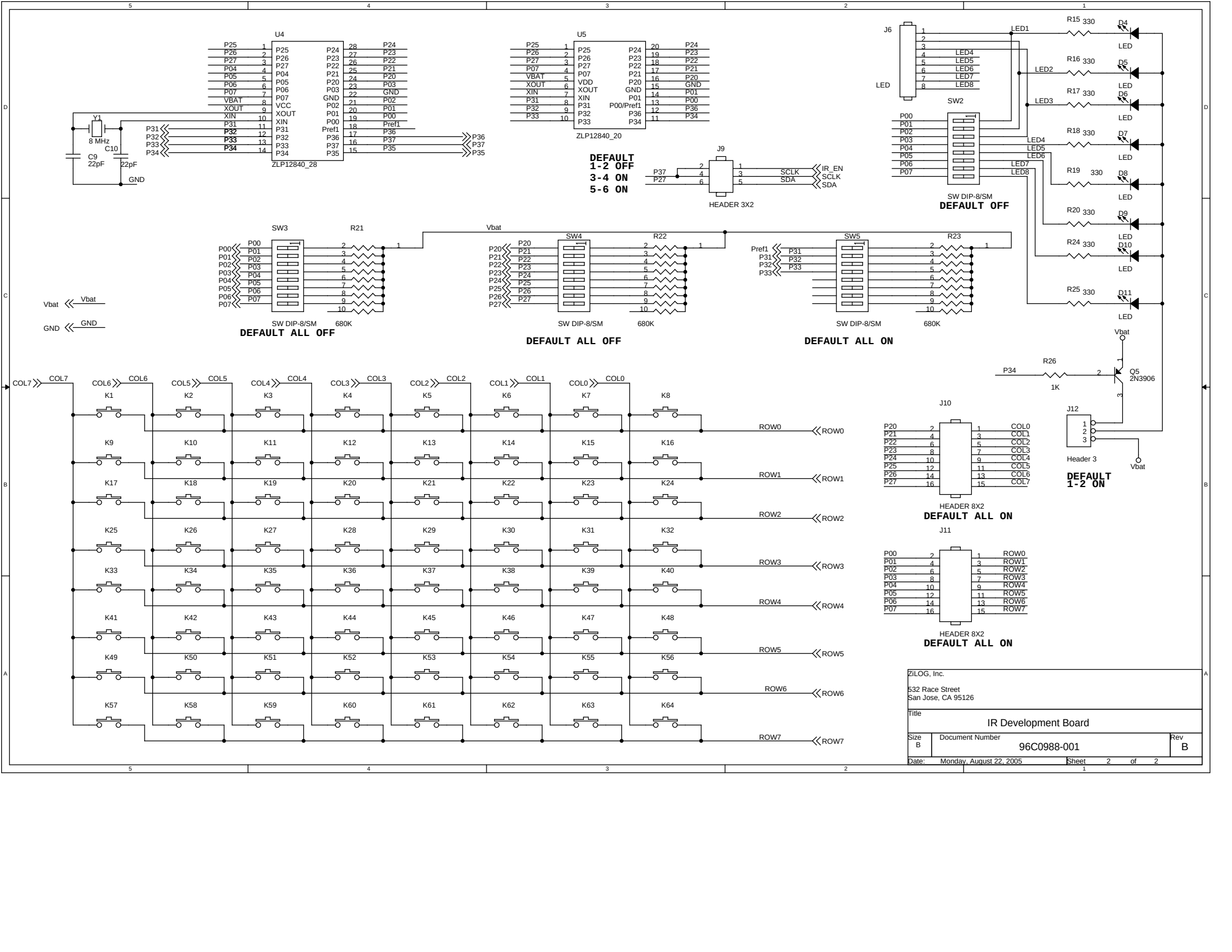

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Title	IR Development Board
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