



eZ80L925048MOD

eZ80L92 Module

Product Specification

PS017005-0903

PRELIMINARY



This publication is subject to replacement by a later edition. To determine whether a later edition exists, or to request copies of publications, contact:

ZiLOG Worldwide Headquarters

532 Race Street
San Jose, CA 95126
Telephone: 408.558.8500
Fax: 408.558.8300
www.ZiLOG.com

ZiLOG is a registered trademark of ZiLOG Inc. in the United States and in other countries. All other products and/or service names mentioned herein may be trademarks of the companies with which they are associated.

Document Disclaimer

©2003 by ZiLOG, Inc. All rights reserved. Information in this publication concerning the devices, applications, or technology described is intended to suggest possible uses and may be superseded. ZiLOG, INC. DOES NOT ASSUME LIABILITY FOR OR PROVIDE A REPRESENTATION OF ACCURACY OF THE INFORMATION, DEVICES, OR TECHNOLOGY DESCRIBED IN THIS DOCUMENT. ZiLOG ALSO DOES NOT ASSUME LIABILITY FOR INTELLECTUAL PROPERTY INFRINGEMENT RELATED IN ANY MANNER TO USE OF INFORMATION, DEVICES, OR TECHNOLOGY DESCRIBED HEREIN OR OTHERWISE. Except with the express written approval ZiLOG, use of information, devices, or technology as critical components of life support systems is not authorized. No licenses or other rights are conveyed, implicitly or otherwise, by this document under any intellectual property rights.

www.DataSheet4U.com

www.DataSheet4U.com



Table of Contents

| | |
|---|----|
| List of Figures | iv |
| List of Tables | v |
| The eZ80L92 Module | 1 |
| Module Features | 1 |
| eZ80L92 Processor Features | 2 |
| Block Diagram | 2 |
| Pin Description | 4 |
| Peripheral Bus Connector | 4 |
| I/O Connector | 8 |
| Onboard Component Description | 12 |
| Logic-Level I/Os | 12 |
| Onboard Battery Backup | 12 |
| Ethernet Media Access Controller | 12 |
| Ethernet LEDs | 12 |
| Ethernet Connectors | 13 |
| GPIO Pins for Enabling LAN Activity, Sleep, Interrupt | 13 |
| EMAC Ports | 14 |
| EMAC Wait States | 14 |
| Memory | 14 |
| Wait States | 14 |
| Static RAM | 15 |
| Flash Memory | 15 |
| IrDA Transceiver | 15 |
| Reset Generator | 15 |
| Serial Interface Ports | 16 |
| Physical Dimensions | 17 |
| Mounting the Module onto the eZ80 [®] Development Platform | 19 |
| ESD/EMI Protection | 20 |
| Absolute Maximum Ratings | 20 |
| Power Supply | 21 |
| Document Number Description | 22 |
| Change Log | 22 |
| Schematic Diagrams | 23 |
| Customer Feedback Form | 32 |
| The eZ80L92 Module Product Specification | 32 |



| | |
|---|----|
| Customer Information | 32 |
| Product Information | 32 |
| Return Information | 32 |
| Problem Description or Suggestion | 32 |



List of Figures

| | | |
|------------|---|----|
| Figure 1. | eZ80L92 Module Functional Block Diagram | 3 |
| Figure 2. | eZ80L92 Module Peripheral Bus Connector Pin Configuration | 4 |
| Figure 3. | eZ80L92 Module I/O Connector Pin Configuration | 8 |
| Figure 4. | Dimension Drawing | 17 |
| Figure 5. | Top Layer | 18 |
| Figure 6. | Bottom Layer | 18 |
| Figure 7. | Mounting Examples | 19 |
| Figure 8. | Power Supply Examples | 21 |
| Figure 9. | eZ80L92 Module Schematic Diagram, #1 of 9—Top Level | 23 |
| Figure 10. | eZ80L92 Module Schematic Diagram, #2 of 9—100-Pin QFP eZ80L92 Device | 24 |
| Figure 11. | eZ80L92 Module Schematic Diagram, #3 of 9— 36-Pin SRAM Device | 25 |
| Figure 12. | eZ80L92 Module Schematic Diagram, #4 of 9—NOR Flash Device | 26 |
| Figure 13. | eZ80L92 Module Schematic Diagram, #5 of 9—E-NET Module | 27 |
| Figure 14. | eZ80L92 Module Schematic Diagram, #6 of 9—IrDA Reset | 28 |
| Figure 15. | eZ80L92 Module Schematic Diagram, #7 of 9—Headers | 29 |
| Figure 16. | eZ80L92 Module Schematic Diagram, #8 of 9—Power Supply | 30 |
| Figure 17. | eZ80L92 Module Schematic Diagram, #9 of 9—Control Logic | 31 |



List of Tables

| | |
|---|----|
| Table 1. eZ80L92 Module Peripheral Bus Connector Pin Identification | 5 |
| Table 2. eZ80L92 Module I/O Connector Pin Identification | 8 |
| Table 3. Ethernet Connector Pin Assignments | 13 |
| Table 4. Chip Frequency to Wait State Cycle Time Calculation. | 14 |
| Table 5. Absolute Maximum Ratings | 20 |



The eZ80L92 Module

The eZ80L92 Module is a compact, high-performance Ethernet module specially designed for the rapid development and deployment of embedded systems requiring control and Internet/Intranet connectivity.

This low-cost, expandable module is powered by ZiLOG's latest power-efficient, high-speed, optimized pipeline architecture eZ80L92 device (eZ80L925048MOD), a member of ZiLOG's new eZ80[®] microprocessor family.

The eZ80L92 microprocessor is a high-speed single-cycle instruction-fetch microprocessor, which can operate with a clock speed of 48MHz. It can operate in Z80-compatible addressing mode (64KB) or full 24-bit addressing mode (16MB).

The rich peripheral set of the eZ80L92 Module makes it suitable for a variety of applications, including industrial control, IrDA connectivity, communication, security, automation, point-of-sale terminals, and embedded networking applications.

Module Features

- eZ80L92 MPU default factory operating clock frequency at 48MHz
- 10Base-T Ethernet Media Access Controller+ PHI with Onboard RJ45 connector
- 512KB zero-wait-state onboard SRAM
- 1MB onboard NOR Flash ROM (90–100ns)
- GoldCap backup for Real-Time Clock
- I/O connector provides 24 general-purpose 5V-tolerant I/O pinouts
- ZiLOG's industry-leading IrDA transceiver—ZiLOG ZHX1810
- In-circuit Flash programming circuitry
- Onboard connector provides I²C 2-wire SDA/SCL interface
- Onboard connector provides I/O bus for external peripheral connections (IRQ, CS, 24 address, 8 data)
- Low-cost adaptation to carrier board via two 2x25pin (2.54mm) headers
- Horizontal or vertical mounting onto the eZ80[®] Development Platform
- Small footprint 64x64mm; height is 24mm
- 3.3V power supply
- Standard operating temperature range: 0°C to +70°C



eZ80L92 Processor Features

- Single-cycle instruction fetch, high-performance, pipelined eZ80[®] CPU core
- Low power features including SLEEP mode, HALT mode, and selective peripheral power-down control
- Two UARTs with independent baud rate generators
- SPI with independent clock rate generator
- I²C with independent clock rate generator
- Infrared Data Association (IrDA)-compliant infrared encoder/decoder
- New DMA-like eZ80[®] instructions for efficient block data transfer
- Glueless external memory interface with 4 chip selects, individual wait state generators, and an external WAIT input pin—supports Intel- and Motorola-style buses
- Fixed-priority vectored interrupts (both internal and external) and interrupt controller
- Real-time clock with on-chip 32KHz oscillator, selectable 50/60Hz input, and separate V_{DD} pin for battery backup
- Six 16-bit Counter/Timers with prescalers and direct input/output drive
- Watch-Dog Timer
- 24 bits of general-purpose I/O
- JTAG and ZDI debug interfaces
- 100-pin LQFP package
- 3.0–3.6V supply voltage with 5V tolerant inputs
- Standard operating temperature range: 0°C to +70°C

► **Note:** All signals with an overline are active Low. For example, $\overline{B/W}$, for which WORD is active Low, and $\overline{B/W}$, for which BYTE is active Low.

Block Diagram

Figure 1 illustrates a block diagram of the eZ80L92 Module.

www.DataSheet4U.com

www.DataSheet4U.com

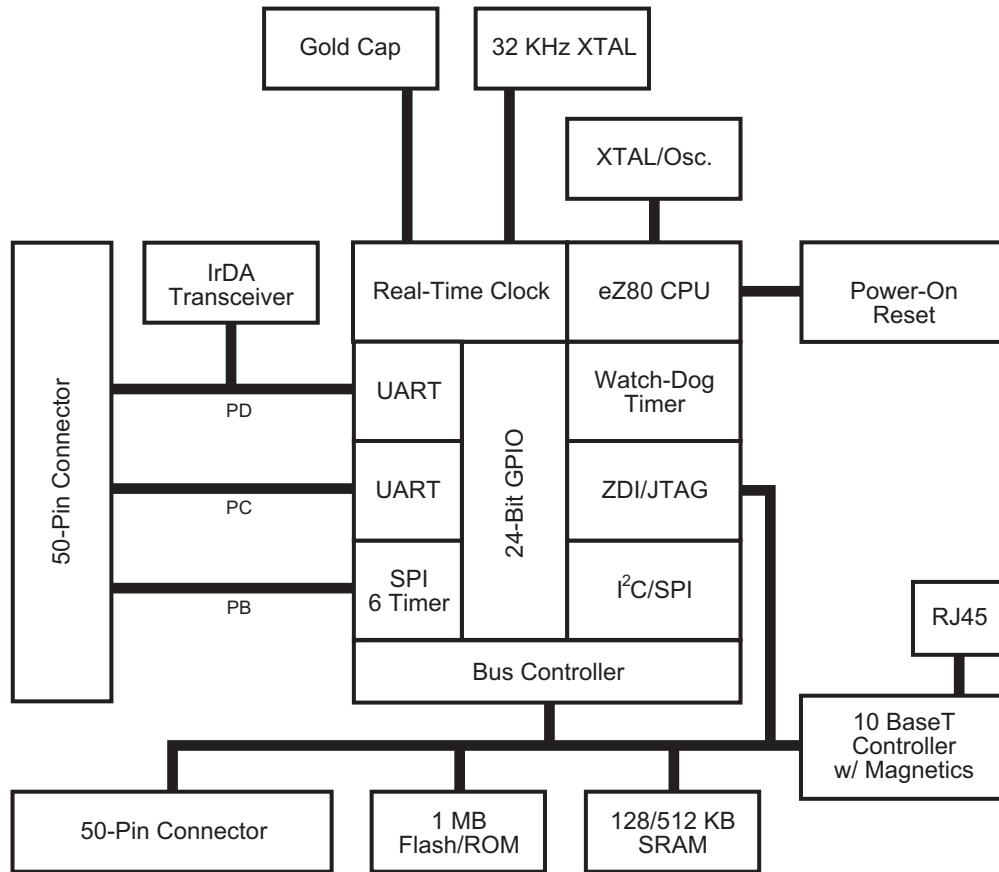


Figure 1. eZ80L92 Module Functional Block Diagram



Pin Description

Peripheral Bus Connector

Figure 2 illustrates the pin layout of the 50-pin I/O Connector, located at position JP1 on the eZ80L92 Module. Table 1 describes the pins and their functions.

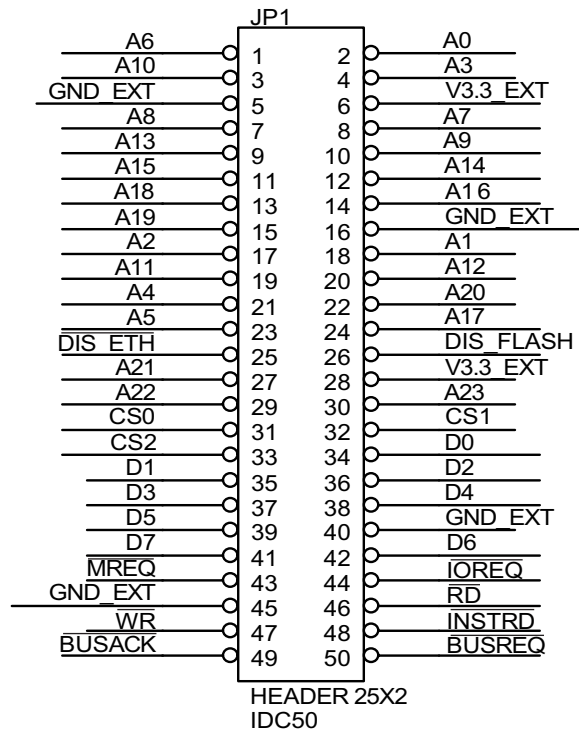


Figure 2. eZ80L92 Module Peripheral Bus Connector Pin Configuration



Table 1. eZ80L92 Module Peripheral Bus Connector Pin Identification*

| Pin # | Symbol | Pull Up/Down* | Signal Direction | Comments |
|-------|-----------------|---------------|------------------|-------------------------------|
| 1 | A6 | | Bidirectional | |
| 2 | A0 | | Bidirectional | |
| 3 | A10 | | Bidirectional | |
| 4 | A3 | | Bidirectional | |
| 5 | GND | | | V _{SS} /Ground (0V). |
| 6 | V _{DD} | | | 3.3V Supply Input Pin. |
| 7 | A8 | | Bidirectional | |
| 8 | A7 | | Bidirectional | |
| 9 | A13 | | Bidirectional | |
| 10 | A9 | | Bidirectional | |
| 11 | A15 | | Bidirectional | |
| 12 | A14 | | Bidirectional | |
| 13 | A18 | | Bidirectional | |
| 14 | A16 | | Bidirectional | |
| 15 | A19 | | Bidirectional | |
| 16 | GND | | | V _{SS} /Ground (0V). |
| 17 | A2 | | Bidirectional | |
| 18 | A1 | | Bidirectional | |
| 19 | A11 | | Bidirectional | |
| 20 | A12 | | Bidirectional | |
| 21 | A4 | | Bidirectional | |
| 22 | A20 | | Bidirectional | |
| 23 | A5 | | Bidirectional | |
| 24 | A17 | | Bidirectional | |

Notes: *External capacitive loads on RD, WR, IORQ, MREQ, D0–D7 and A0–A23 should be below 10pF to satisfy timing requirements for the eZ80[®] CPU.

All unused inputs should be pulled to either V_{DD} or GND, depending on their inactive level, to reduce power consumption and to reduce noise sensitivity.

To prevent EMI, the EZ80CLK output can be deactivated via software in the eZ80L92 Peripheral Power-Down Register.

All inputs are CMOS level 3.3V (5V tolerant), except where otherwise noted.



Table 1. eZ80L92 Module Peripheral Bus Connector Pin Identification* (Continued)

| Pin # | Symbol | Pull Up/Down* | Signal Direction | Comments |
|-------|-----------------|-----------------|------------------|--|
| 25 | DIS_Eth | PU 10K Ω | Input | A Low disables <u>on</u> -module EMAC from <u>responding</u> to CS3 on a per-cycle basis. CS3 can be used on the eZ80 [®] Development Platform; CMOS Input 3.3V (5V tolerant) |
| 26 | DIS_Flash | PU 10K Ω | Input | A Low disables <u>on</u> -module Flash memory from <u>responding</u> to CS0 on a per-cycle basis. CS0 can be used on the eZ80 [®] Development Platform for external memory purposes; CMOS Input 3.3V (5V tolerant). |
| 27 | A21 | | Bidirectional | |
| 28 | V _{DD} | | | 3.3V supply input pin. |
| 29 | A22 | | Bidirectional | |
| 30 | A23 | | Bidirectional | |
| 31 | CS0 | | Output | |
| 32 | CS1 | | Output | |
| 33 | CS2 | | Output | |
| 34 | D0 | PU 4k7 Ω | Bidirectional | |
| 35 | D1 | PU 4k7 Ω | Bidirectional | |
| 36 | D2 | PU 4k7 Ω | Bidirectional | |
| 37 | D3 | PU 4k7 Ω | Bidirectional | |
| 38 | D4 | PU 4k7 Ω | Bidirectional | |
| 39 | D5 | PU 4k7 Ω | Bidirectional | |
| 40 | GND | | | V _{SS} /Ground (0V). |
| 41 | D7 | PU 4k7 Ω | Bidirectional | |
| 42 | D6 | | Bidirectional | |
| 43 | MREQ | | Bidirectional | |

Notes: *External capacitive loads on RD, WR, IORQ, MREQ, D0–D7 and A0–A23 should be below 10pF to satisfy timing requirements for the eZ80[®] CPU.

All unused inputs should be pulled to either V_{DD} or GND, depending on their inactive levels to reduce power consumption and to reduce noise sensitivity.

To prevent EMI, the EZ80CLK output can be deactivated via software in the eZ80L92 Peripheral Power-Down Register.

All inputs are CMOS level 3.3V (5V tolerant), except where otherwise noted.



Table 1. eZ80L92 Module Peripheral Bus Connector Pin Identification* (Continued)

| Pin # | Symbol | Pull Up/Down* | Signal Direction | Comments |
|-------|----------------------------|-----------------|------------------|------------------------|
| 44 | $\overline{\text{IORQ}}$ | | Bidirectional | |
| 45 | GND | | | V_{SS} /Ground (0V). |
| 46 | $\overline{\text{RD}}$ | | Bidirectional | |
| 47 | $\overline{\text{WR}}$ | | Bidirectional | |
| 48 | $\overline{\text{INSTRD}}$ | | Output | |
| 49 | $\overline{\text{BUSACK}}$ | PU 10K Ω | Output | |
| 50 | $\overline{\text{BUSREQ}}$ | PU 10K Ω | Input | |

Notes: *External capacitive loads on $\overline{\text{RD}}$, $\overline{\text{WR}}$, $\overline{\text{IORQ}}$, $\overline{\text{MREQ}}$, D0–D7 and A0–A23 should be below 10pF to satisfy timing requirements for the eZ80[®] CPU.
 All unused inputs should be pulled to either V_{DD} or GND, depending on their inactive levels to reduce power consumption and to reduce noise sensitivity.
 To prevent EMI, the EZ80CLK output can be deactivated via software in the eZ80L92 Peripheral Power-Down Register.
 All inputs are CMOS level 3.3V (5V tolerant), except where otherwise noted.

I/O Connector

Figure 3 illustrates the pin layout of the 50-pin I/O Connector, located at position JP2 of the eZ80L92 Module. Table 2 describes the pins and their functions.

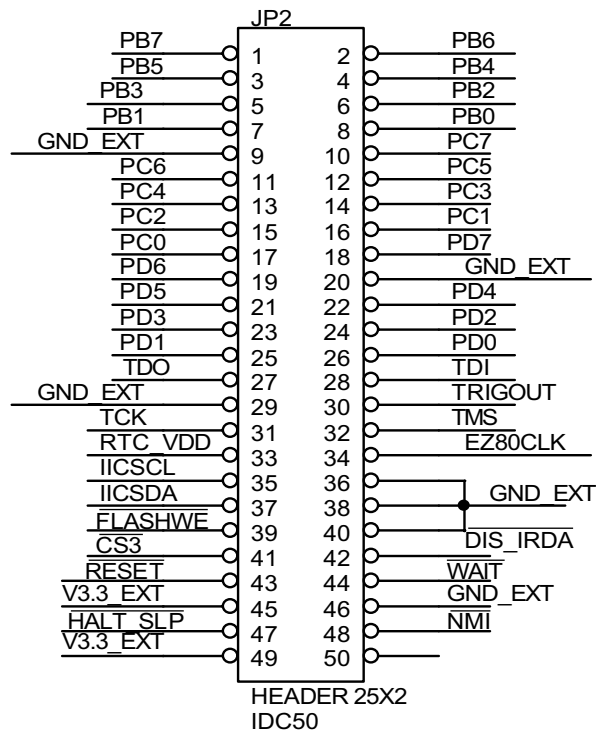


Figure 3. eZ80L92 Module I/O Connector Pin Configuration

Table 2. eZ80L92 Module I/O Connector Pin Identification*

| Pin # | Symbol | Pull Up/Down | Signal Direction | Comments |
|-------|--------|--------------|------------------|----------|
| 1 | PB7 | | Bidirectional | |
| 2 | PB6 | | Bidirectional | |

Notes: *External capacitive loads on RD, WR, IORQ, MREQ, D0–D7 and A0–A23 should be below 10pF to satisfy timing requirements for the CPU.

All unused inputs should be pulled to either V_{DD} or GND, depending on their inactive levels, to reduce power consumption and to reduce noise sensitivity.

To prevent EMI, the EZ80CLK output can be deactivated via software in the eZ80F91 Peripheral Power-Down Register.

All inputs are CMOS level 3.3V (5V tolerant), except where otherwise noted.



Table 2. eZ80L92 Module I/O Connector Pin Identification* (Continued)

| Pin # | Symbol | Pull Up/Down | Signal Direction | Comments |
|-------|--------|--------------|------------------|-------------------------------|
| 3 | PB5 | | Bidirectional | |
| 4 | PB4 | | Bidirectional | |
| 5 | PB3 | | Bidirectional | |
| 6 | PB2 | | Bidirectional | |
| 7 | PB1 | | Bidirectional | |
| 8 | PB0 | | Bidirectional | |
| 9 | GND | | | V _{SS} /Ground (0V). |
| 10 | PC7 | | Bidirectional | |
| 11 | PC6 | | Bidirectional | |
| 12 | PC5 | | Bidirectional | |
| 13 | PC4 | | Bidirectional | |
| 14 | PC3 | | Bidirectional | |
| 15 | PC2 | | Bidirectional | |
| 16 | PC1 | | Bidirectional | |
| 17 | PC0 | | Bidirectional | |
| 18 | PD7 | | Bidirectional | |
| 19 | PD6 | | Bidirectional | |
| 20 | GND | | | V _{SS} /Ground (0V). |
| 21 | PD5 | | Bidirectional | |
| 22 | PD4 | PD 4k7 | Bidirectional | |
| 23 | PD3 | | Bidirectional | |
| 24 | PD2 | | Bidirectional | |
| 25 | PD1 | | Bidirectional | |
| 26 | PD0 | | Bidirectional | |

Notes: *External capacitive loads on RD, WR, IORQ, MREQ, D0–D7 and A0–A23 should be below 10pF to satisfy timing requirements for the CPU.

All unused inputs should be pulled to either V_{DD} or GND, depending on their inactive levels, consumption and to reduce noise sensitivity.

To prevent EMI, the EZ80CLK output can be deactivated via software in the eZ80F91 Peripheral Power-Down Register.

All inputs are CMOS level 3.3V (5V tolerant), except where otherwise noted.



Table 2. eZ80L92 Module I/O Connector Pin Identification* (Continued)

| Pin # | Symbol | Pull Up/Down | Signal Direction | Comments |
|-------|---------------------|-----------------|------------------|---|
| 27 | TDO | | Output | JTAG data output pin. |
| 28 | TDI/ZDA | PU 10K Ω | Input | JTAG data input pin. |
| 29 | GND | | | V _{SS} /Ground (0V). |
| 30 | TRIGOUT | | Output | Active High trigger event indicator. |
| 31 | TCK/ZCL | PU 10K Ω | Input | JTAG clock. High on reset enables ZDI mode; Low on reset enables OCI debug. |
| 32 | TMS | PU 10K Ω | Input | JTAG Test Mode Select. |
| 33 | RTC_V _{DD} | | | RTC supply from GoldCap (or external battery). |
| 34 | EZ80CLK | | Output | 48MHz synchronous CPU clock. |
| 35 | SCL | PU 4k7 | Bidirectional | I ² C Bus Clock. |
| 36 | GND | | | V _{SS} /Ground (0V). |
| 37 | SDA | PU 4k7 | Bidirectional | I ² C Bus Data. |
| 38 | GND | | | V _{SS} /Ground (0V). |
| 39 | FlashWE | PU 10K Ω | Input | Low enables Write to onboard Flash memory. If this pin is unconnected, the Flash memory is write-protected. |
| 40 | GND | | | V _{SS} /Ground (0V). |
| 41 | CS3 | | Output | Used on module for CS8900 EMAC. |
| 42 | DIS_IRDA | PU 10K Ω | Input | Low disables onboard IRDA transceiver to use PD0/PD1 UART pins externally. |
| 43 | RESET | PU 2k2 | Bidirectional | Reset output from Module or push-button reset. |
| 44 | WAIT | PU 2k2 | Input | Driving the WAIT pin Low forces the eZ80 [®] CPU to provide additional clock cycles for an external peripheral or external memory to complete its Read or Write operation. |
| 45 | V _{DD} | | | 3.3V supply input pin. |

Notes: *External capacitive loads on RD, WR, IORQ, MREQ, D0–D7 and A0–A23 should be below 10pF to satisfy timing requirements for the CPU.

All unused inputs should be pulled to either V_{DD} or GND, depending on their inactive levels, to reduce power consumption and to reduce noise sensitivity.

To prevent EMI, the EZ80CLK output can be deactivated via software in the eZ80F91 Peripheral Power-Down Register.

All inputs are CMOS level 3.3V (5V tolerant), except where otherwise noted.



Table 2. eZ80L92 Module I/O Connector Pin Identification* (Continued)

| Pin # | Symbol | Pull Up/Down | Signal Direction | Comments |
|-------|----------|-----------------|-----------------------------------|--|
| 46 | GND | | | V_{SS} /Ground (0V). |
| 47 | HALT_SLP | | Output, Active Low | A Low on this pin indicates that the eZ80 [®] CPU enters either HALT or SLEEP mode because of execution of either a HALT or SLP instruction. |
| 48 | NMI | PU 10K Ω | Schmitt Trigger Input, Active Low | The NMI input is a higher priority input than the maskable interrupts. It is always recognized at the end of an instruction, regardless of the state of the interrupt enable control bits. This input includes a Schmitt trigger to allow RC rise times. This external NMI signal is combined with an internal NMI signal generated from the WDT block before being connected to the NMI input of the eZ80 [®] CPU. |
| 49 | V_{DD} | | | 3.3V supply input pin. |
| 50 | Reserved | | NC | Reserved—No Connection. |

Notes: *External capacitive loads on RD, WR, IORQ, MREQ, D0–D7 and A0–A23 should be below 10pF to satisfy timing requirements for the CPU.
 All unused inputs should be pulled to either V_{DD} or GND, depending on their inactive levels, to reduce power consumption and to reduce noise sensitivity.
 To prevent EMI, the EZ80CLK output can be deactivated via software in the eZ80F91 Peripheral Power-Down Register.
 All inputs are CMOS level 3.3V (5V tolerant), except where otherwise noted.



Onboard Component Description

Logic-Level I/Os

The I/O connector features 24 general-purpose 3.3V CMOS I/O pins that can be used as outputs or inputs interfacing to external logic. All I/Os are 5V tolerant. Some of the General-Purpose I/O pins support dual mode functions (SPI, Timer I/O, UARTs and bit I/O with edge- or level-triggered interrupt functions on each pin). For more information on eZ80L92 dual modes, please refer to the [eZ80L92 Product Specification](#) (PS0130).

Onboard Battery Backup

An onboard 0.1F capacitor (GoldCap) is used to bridge power outages of 2–4 hours if the power supply to the module is disconnected. The capacitor is charged to 3.1V during normal operation and is discharged through the on-chip Real Time Clock. The V_{RTC} pin is available on the I/O connector of the module to connect external components to a power supply or to a larger GoldCap.



Caution: Do not connect a Lithium Battery to the GoldCap capacitor, because onboard charging circuitry for the capacitor can destroy the lithium battery.

Ethernet Media Access Controller

The eZ80L92 Module contains a CS8900A EMAC (MAC, PHI, and RAM) which is attached to the data/address bus of the processor. This chip is connected to the processor's CS3 Chip Select, A0–A3, D0–D7, RD, WR, and PD4 pins for interrupt purposes. Connection of pins PD6 and PD7 for LANACT (wake-up from sleep) and SLEEP is optional and resistor-selectable onboard (see below).

Ethernet LEDs

There are two green LEDs, a Link LED and a LAN LED, that are located adjacent to each other on the eZ80L92 Module. A flashing LAN LED (top) indicates received link pulses from the 10Base-T Ethernet. This LAN LED should be ON if RX+ is connected to TX+ and RX– is connected to TX–. A steady Link LED (bottom) indicates Traffic (RX or TX) on the LAN.



An RJ45 loopback connector can be used to verify the correct operation of the Receiver and the Transmitter. The green LED should be on if RX+ is connected with TX+ and RX– is connected with TX–.

Ethernet Connectors

The eZ80L92 Module is equipped with an RJ45 connector that features integrated magnetics (transformer, common mode chokes). The remaining pins on the onboard RJ45 connector are not connected.

Node assignments for the RJ45 Ethernet connector are shown in Table 3.

Table 3. Ethernet Connector Pin Assignments

| Pin | Function |
|-----|----------|
| 1 | TX+ |
| 2 | TX– |
| 3 | RX+ |
| 6 | RX– |

Node assignment, in contrast to hub assignment, means that a straight-through cable (equivalent pin numbers on both sides of the cable are connected to each other) is used to attach the board to an Ethernet hub or switch. To connect the eZ80L92 Module directly to another node (e.g., a personal computer), a crossover cable must be used.

The EMAC can be additionally protected by placing a U9 ESD protection array on the module. This array can be either of the LCDA15C-6 (Semtech) or ESDA25B1 (ST Microelectronics) devices.

GPIO Pins for Enabling LAN Activity, Sleep, Interrupt

GPIO input bit PD4 serves as an active High interrupt input for the EMAC's INTRQ0 output.

GPIO output bit PD7 can be used to enter the EMAC into SLEEP mode. When pulling SLEEP (PD7) Low after enabling HWStandbyE and HWSleepE modes, the chip draws lower current, because only the receiver is operating. A zero-Ohm resistor at position R14 on the eZ80L92 Module is required for this function. In this case, the PD6 pin is not available for GPIO on the I/O connector.

www.DataSheet4U.com

www.DataSheet4U.com

If LAN activity is detected, the LANACT signal is pulled Low. The LANACT is connected to GPIO input PD6 and can be used in interrupt edge-detection mode to wake up and reinitialize the Ethernet chip. A zero-Ohm resistor at position R15 on



the module is required for this function. In this case, the PD6 pin is not available for GPIO on the I/O connector.

EMAC Ports

Chip Select CS3 is used for selecting the EMAC via I/O decoding. The I/O base address is user-selectable. The EMAC is connected as an 8- or 16-bit device with 8-word-wide I/O registers:

EMAC Wait States

The CS8900A EMAC should be operated in Intel bus mode so that the setup and hold times for the I/O access are met. For 48MHz operation, first set CS3_BMC (I/O address 0xF3h) to 84h (Intel bus mode with four system clock cycles per bus cycle) and then CS3_CTL (I/O Address 0xB3) to 18h (0 wait states for I/O). For a 20.8ns CPU Clock cycle time, the Read and Write access time is:

$$2 \times 4 \times 20.8\text{ns} - 16\text{ns} \text{ (for capacitive and chip delays)} = 150\text{ns}$$

Memory

The eZ80L92 Module offers SRAM and Flash memories and the wait states that support memory operations, as described in this section.

Wait States

To ensure that valid data is read from or written to slower memories, a number of wait states must be inserted into the memory or I/O access operations by the processor. The number of wait states that are required should be added by programming the chip select control registers. To calculate the minimum number of wait states required, refer to Table 4.

Table 4. Chip Frequency to Wait State Cycle Time Calculation

| MHz | Cycle Time |
|-----|------------|
| 12 | 83.3ns |
| 20 | 50.0ns |
| 24 | 41.7ns |
| 36 | 27.8ns |
| 40 | 25.0ns |
| 48 | 20.8ns |



Static RAM

The eZ80L92 Module features 512KB of fast SRAM. Access speed is typically 12ns or faster, allowing zero-wait-state operation at 48MHz. With the CPU at 48MHz, onboard SRAM can be accessed with zero wait states in eZ80 mode. CS1_CTL (chip select CS1) can be set to 08h (no wait states).

Flash Memory

The Flash Boot Loader, application code, and user configuration data are held permanently in NOR Flash memory. A typical application requires eight times more ROM for code than RAM. As an example, for 128KB onboard SRAM, 1MB of ROM is required. The eZ80L92 Module allows NOR Flash memories between 4 megabits (512KB) and 32 megabits (4MB) to be used. The chips are housed in wide TSOP40 cases. Flash ROM access times are 55–150ns; typically 90ns.

NOR Flash should be operated in Intel bus mode to satisfy setup and hold times and to prevent bus contention with a Write cycle that could possibly follow. For proper CPU operation at 48MHz, first set the bus mode control register CS0_BMC (I/O address 0xF0h) to 82h, then set the Chip Select Control register CS0_CTL (I/O address 0xAAh) to 08h. These settings select Intel Bus Mode with two system clocks per bus cycle and zero wait states.

IrDA Transceiver

An onboard IrDA transceiver (ZiLOG ZHX1810) is connected to PD0 (TX), PD1 (RX), and PD2 (Shutdown, R_SD). The IrDA transceiver is of the LED type 870nm Class 1.

The receiver supply current is 90–150µA and the transmitter supply current is 260mA when the LED is active. The IrDA transceiver is accessible via the IrDA controller attached to UART0 on the eZ80L92 device. The UART0 console and the IrDA transceiver cannot be used simultaneously.

To use the UART0 for console or to save power, the transceiver can be disabled by the software or by an off-board signal when using the proper jumper selection. The transceiver is disabled by setting PD2 (IR_SD) High or by pulling the DIS_IRDA pin on the I/O connector Low. The shutdown is used for power savings. To enable the IrDA transceiver, DIS_IRDA is left floating and PD2 is set to Low.

Reset Generator

The onboard Reset Generator Chip performs reliable Power-On Reset. The chip generates a reset pulse with a duration of 200ms if the power supply drops below



2.93V. This reset pulse ensures that the board always starts in a defined condition. The RESET pin on the I/O connector reflects the status of the RESET line. It is a bidirectional pin for resetting external peripheral components or for resetting the eZ80L92 Module with a low-impedance output (e.g. a 100-Ohm pushbutton).

Serial Interface Ports

The processor contains two 16550-style UARTs with programmable baud rate generators. UART0 is typically used for console I/O and initial boot code upload or to connect remote peripherals that can be controlled and monitored via Ethernet. UART0 is connected to GPIO PD[0:3] on the I/O connector. There are no RS232-level shifters on the eZ80L92 Module.

► **Note:** Do not connect an RS-232 interface without level shifters.

UART1 can be used for modem attachment or as a communications port to a host computer, where the embedded Ethernet module emulates an AT-style modem for internet access. UART1 does not offer onboard RS232-level shifters.

Physical Dimensions

The size of the eZ80L92 Module PCB is 64x64mm. With an RJ45 Ethernet connector, the overall height is 25mm, as shown in Figure 4.

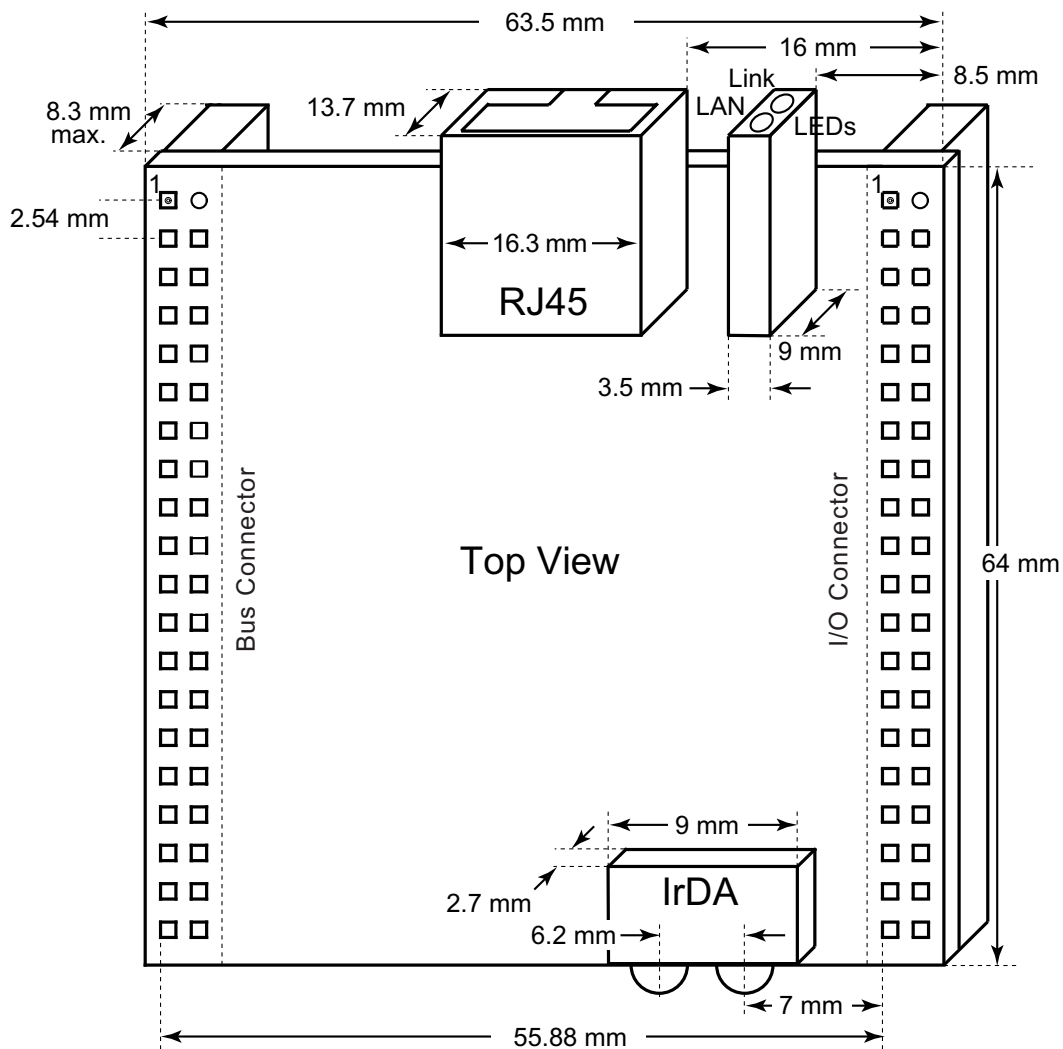


Figure 4. Dimension Drawing

Figure 5 illustrates a top view of the eZ80L92 Module.

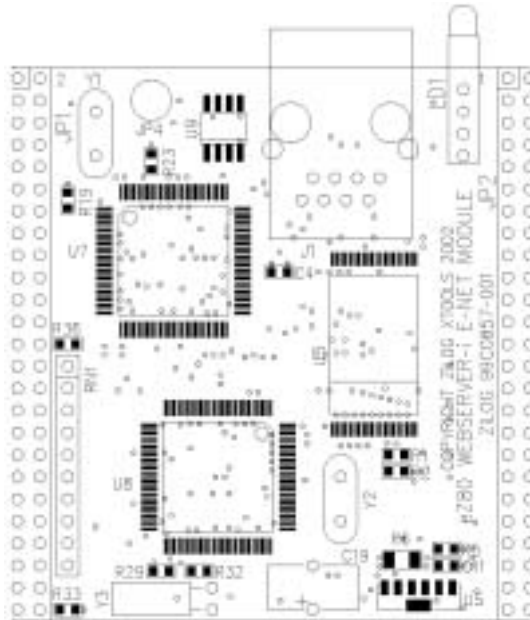


Figure 5. Top Layer

Figure 6 illustrates a bottom view of the eZ80L92 Module.

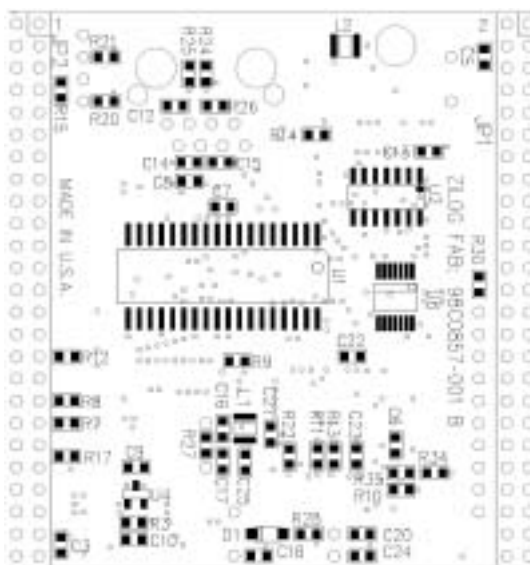


Figure 6. Bottom Layer

Mounting the Module onto the eZ80[®] Development Platform

The eZ80L92 Module can be mounted in several positions. Depending on volume and area restrictions, it can be mounted horizontally or vertically with or without components between the connectors on the eZ80[®] Development Platform. See Figure 8 for examples.

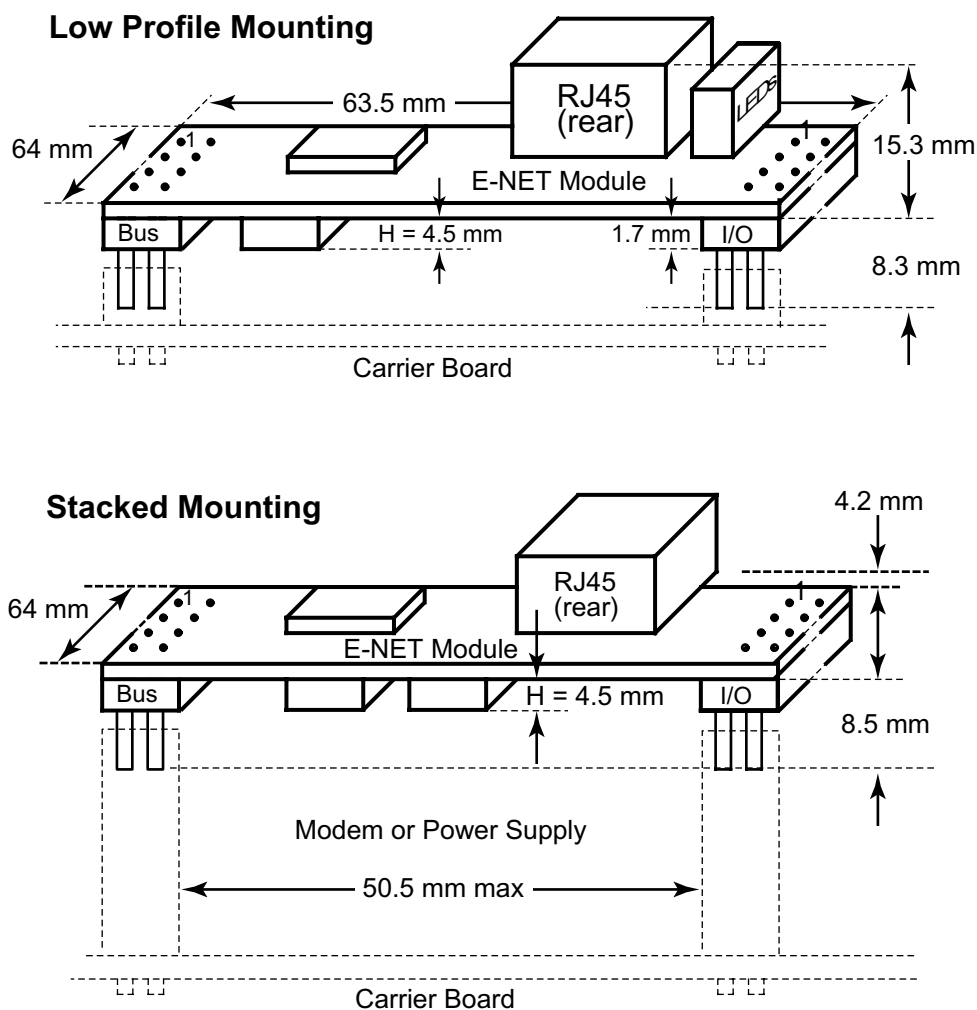


Figure 7. Mounting Examples



ESD/EMI Protection



Caution: The eZ80L92 Module is a component that is intended to be part of a system design for end-user devices. Therefore, the user must exercise caution to use ESD protection on the I/O pins.

The EMAC can be additionally protected by placing an ESD protection array on the eZ80L92 Module at position U9. Either use ESDA25B1 from ST Microelectronics or LCDA15C-6 from Semtech. A mounting hole on the board can be used for grounding the shield of the Ethernet RJ45 jack to prevent surge or ESD currents from flowing through the digital circuitry.

The RJ45 Ethernet Connector on the eZ80L92 Module contains a transformer and common mode chokes for EMI suppression.



Caution: CMOS I/Os are ESD-sensitive and must be handled with care. Handling of the module should be performed in ESD-safe environments (for example with a wrist-wrap attached). When developing applications, the user must provide for proper ESD protection on external, user-accessible I/Os (e.g. suppressor arrays for the I/Os).

The components are mounted on a multilayer PCB to provide a stable ground plane for onboard components. The module features several GND pins next to pins with higher switching frequency for short ground returns. If unused, the clock output can be separated from the module header by removing a series resistor on the module. Removing the series resistor further reduces electromagnetic emissions.

Absolute Maximum Ratings

Stresses greater than those listed in Table 5 can cause permanent damage to the device. These ratings are stress ratings only. Operation of the device at any condition outside those indicated in the operational sections of these specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability. For improved reliability, unused inputs should be tied to one of the supply voltages (V_{DD} or V_{SS}).

Table 5. Absolute Maximum Ratings

| Parameter | Min | Max | Units |
|---------------------------------|-----|-----|-------|
| Standard operating temperature | 0 | +70 | °C |
| Storage temperature | -45 | +85 | °C |
| Operating Humidity (RH @ 50°C) | 25% | 90% | |
| Operating Voltage ($\pm 5\%$) | — | 3.3 | V |

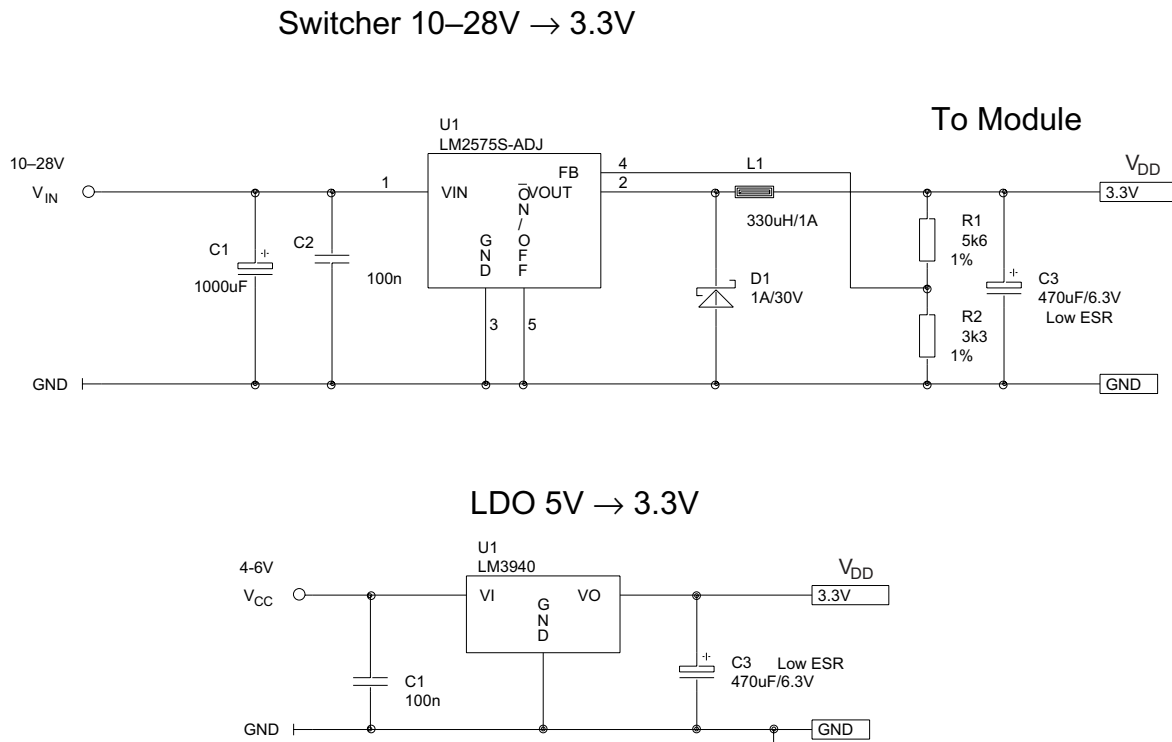
Power Supply

The eZ80L92 Module requires a regulated external 3.3VDC/0.5A power supply. You may use a Low Dropout Regulator (LDO) to get 3.3V from 5V or use the following switcher circuit to generate 3.3V from unregulated 10-28V power supply.

Power connections follow these conventional descriptions:

| Connection | Circuit | Device |
|------------|-----------------|-----------------|
| Power | V _{CC} | V _{DD} |
| Ground | GND | V _{SS} |

Figure 8 offers two typical power supply examples.



www.DataSheet4U.com

Figure 8. Power Supply Examples

www.DataSheet4U.com



Document Number Description

The Document Control Number that appears in the footer of each page of this document contains unique identifying attributes, as indicated in the following table:

| | |
|------|--------------------------|
| PS | Product Specification |
| 0170 | Unique Document Number |
| 05 | Revision Number |
| 0903 | Month and Year Published |

Change Log

| Rev | Date | Purpose | By |
|------------|----------------|---------------------|--------------------------|
| 01 | June 2002 | Original issue | M. Staubermann, R. Pujar |
| 02 | July 2002 | Minor modifications | M. Staubermann, R. Beebe |
| 03 | October 2002 | Minor modifications | R. Beebe |
| 04 | January 2003 | Minor modifications | R. Beebe |
| 05 | September 2003 | Minor modifications | R. Beebe |

Schematic Diagrams

Figures 9 through 17 diagram the layout of the eZ80L92 Module.

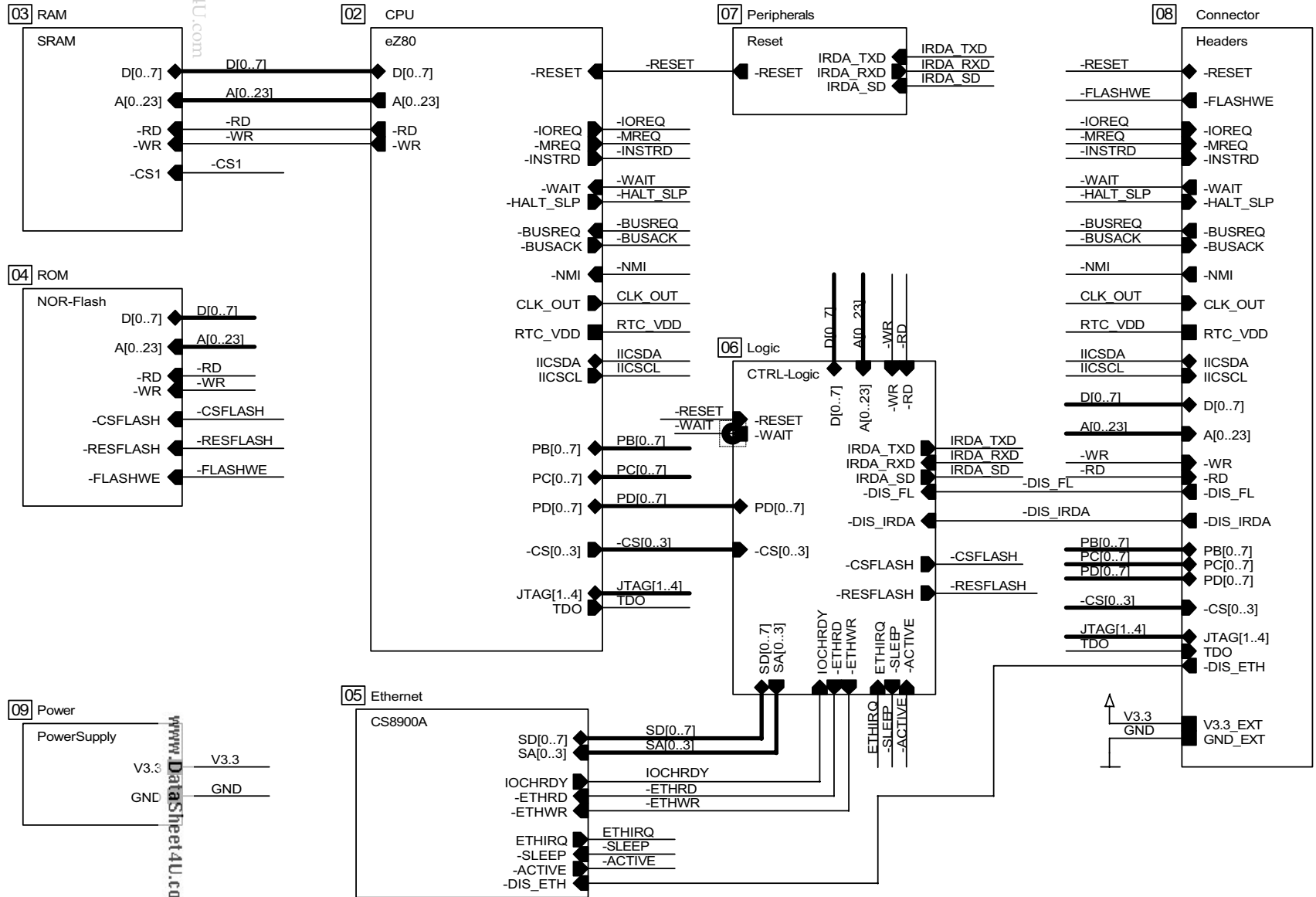


Figure 9. eZ80L92 Module Schematic Diagram, #1 of 9—Top Level

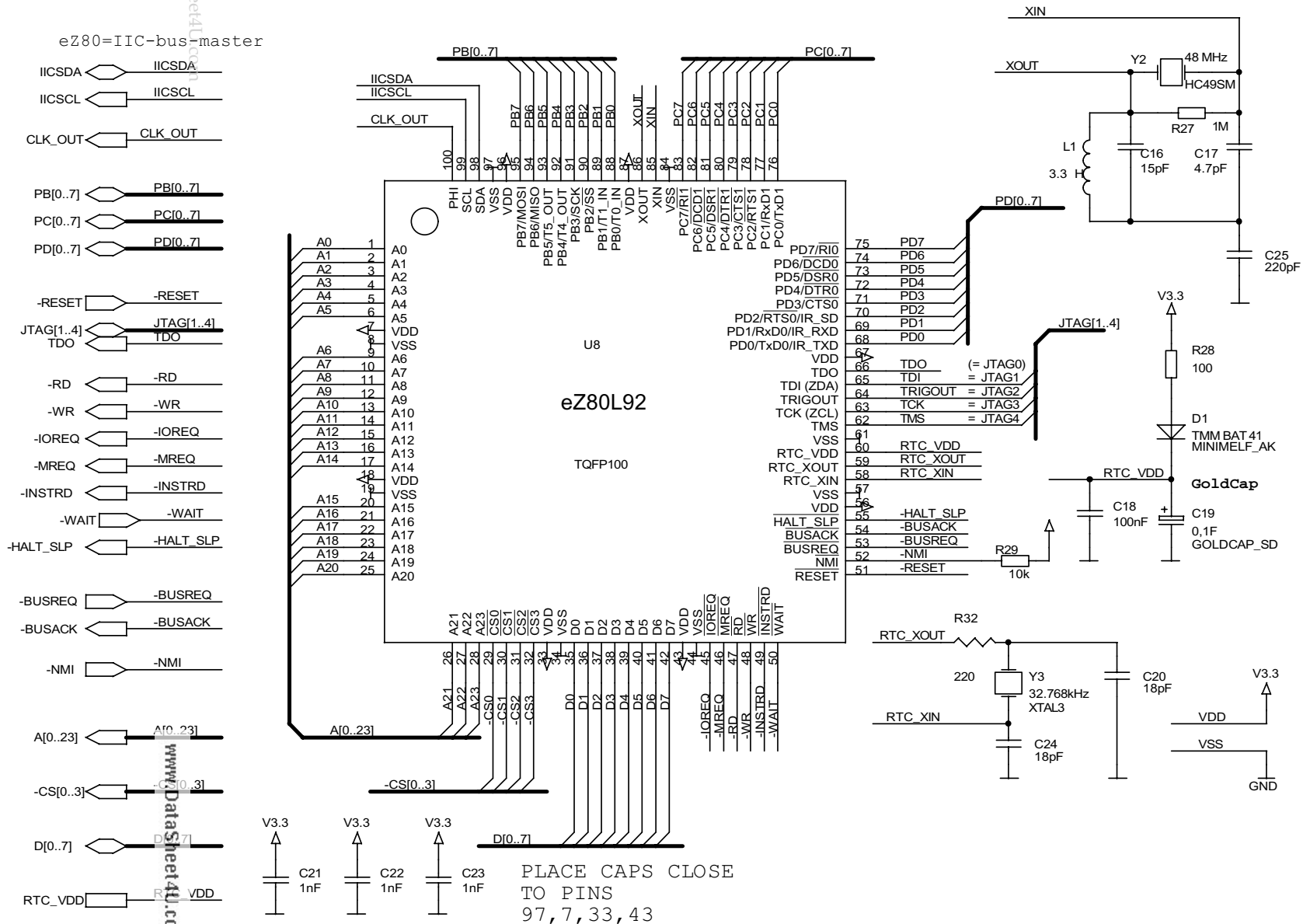
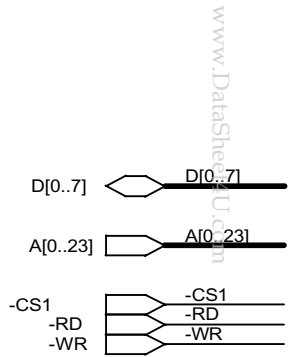


Figure 10. eZ80L92 Module Schematic Diagram, #2 of 9—100-Pin QFP eZ80L92 Device



A21/A22/A23
not used
here

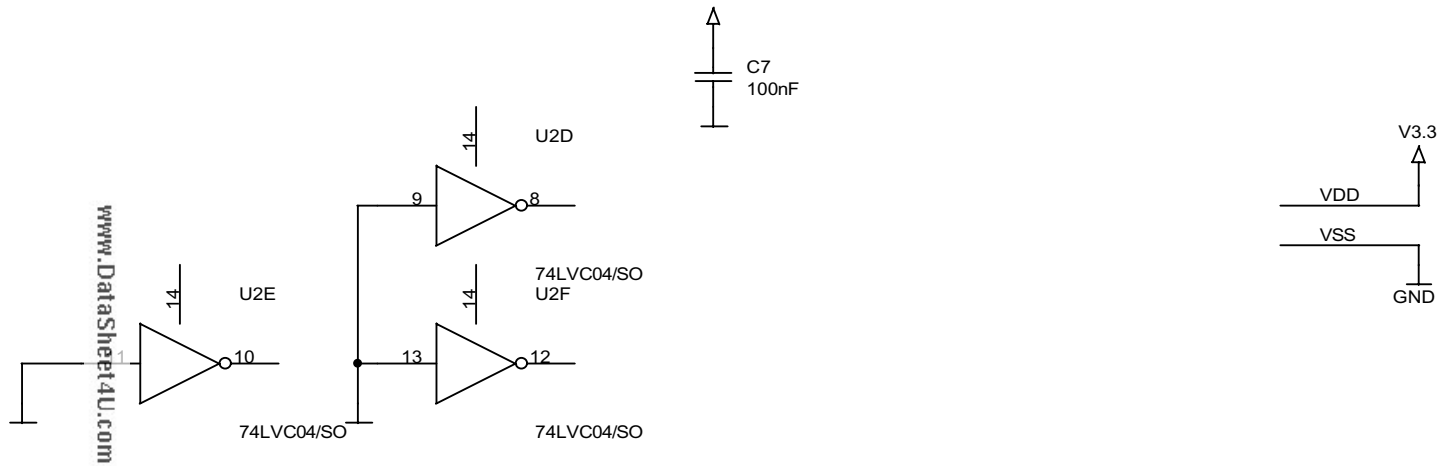
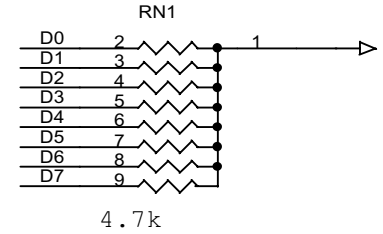
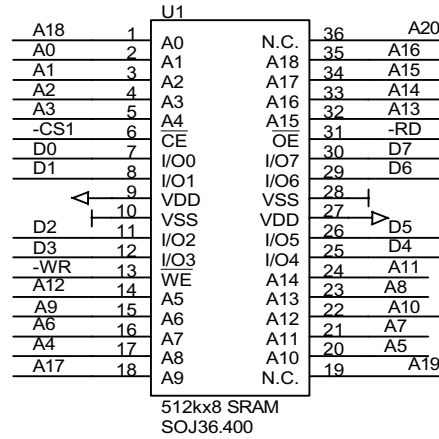


Figure 11. eZ80L92 Module Schematic Diagram, #3 of 9—36-Pin SRAM Device

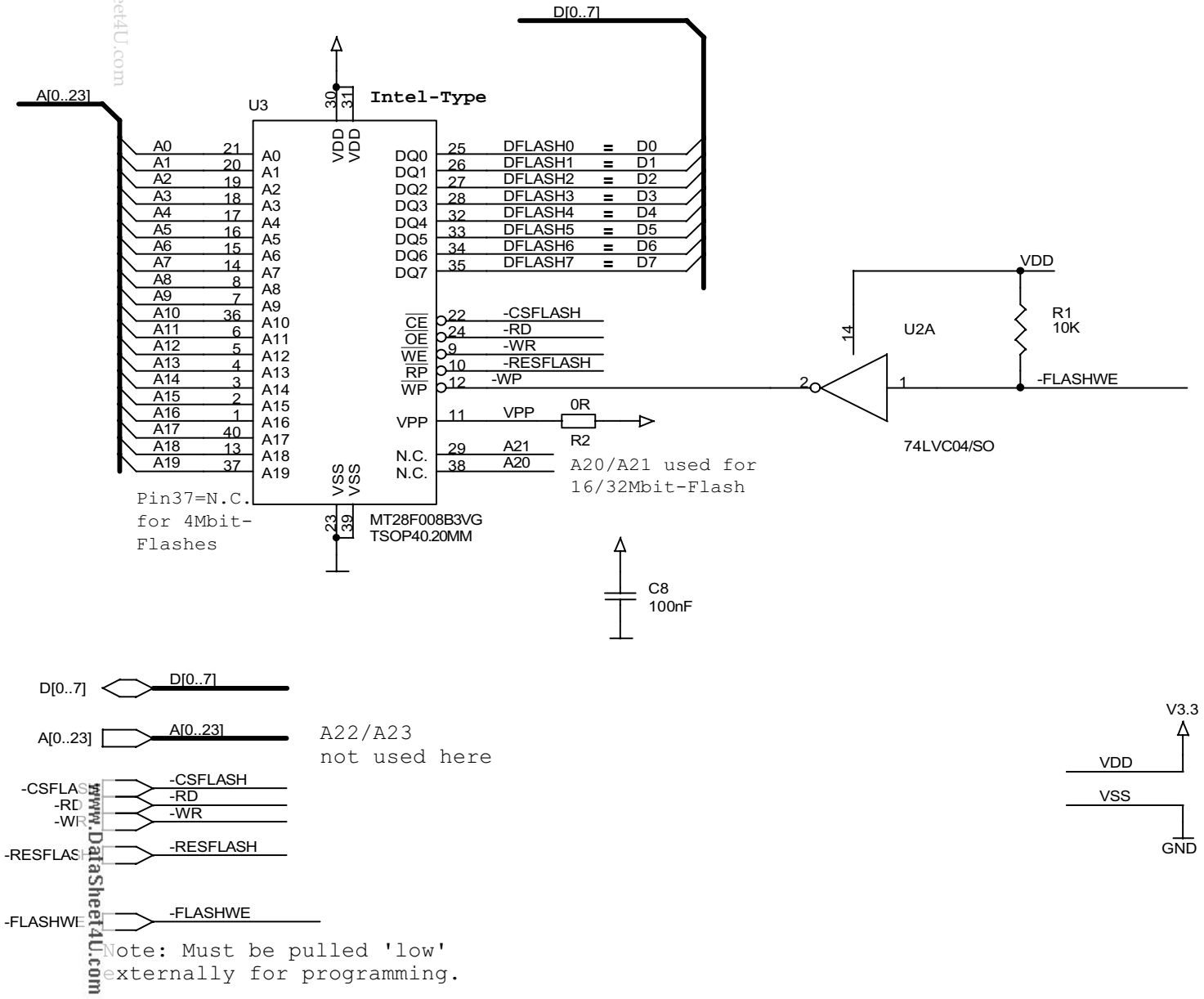


Figure 12. eZ80L92 Module Schematic Diagram, #4 of 9—NOR Flash Device

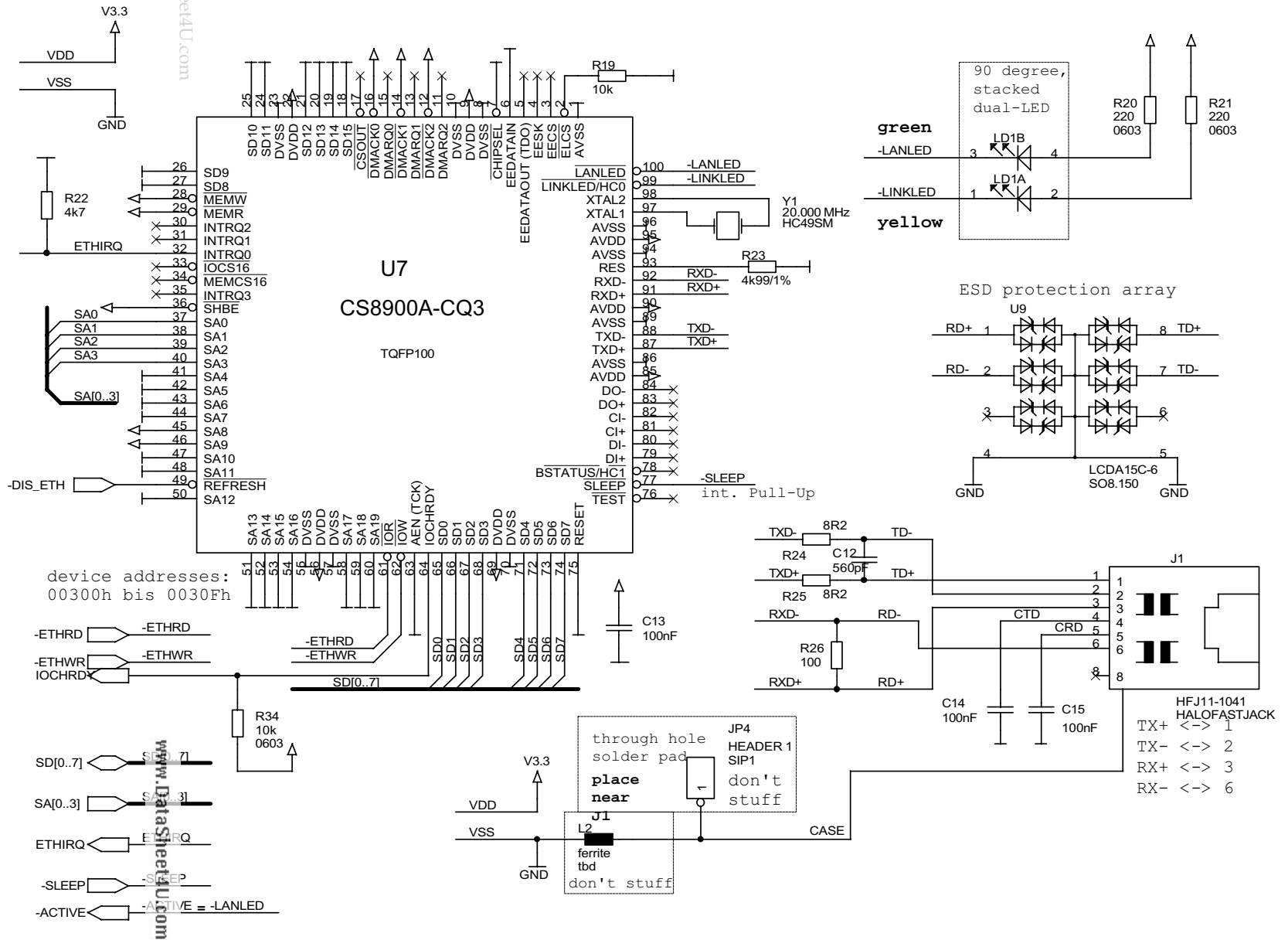
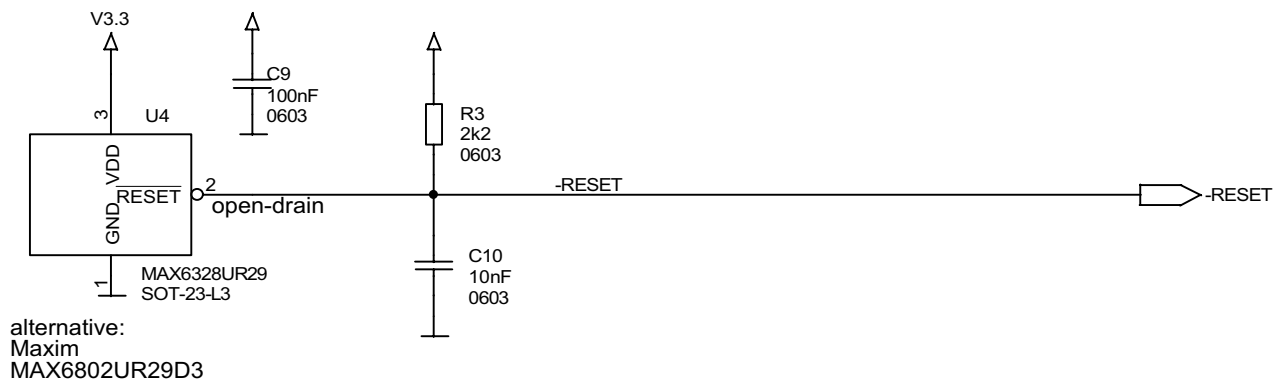


Figure 13. eZ80L92 Module Schematic Diagram, #5 of 9—E-NET Module

www.DataSheet4U.com



IR-transceiver

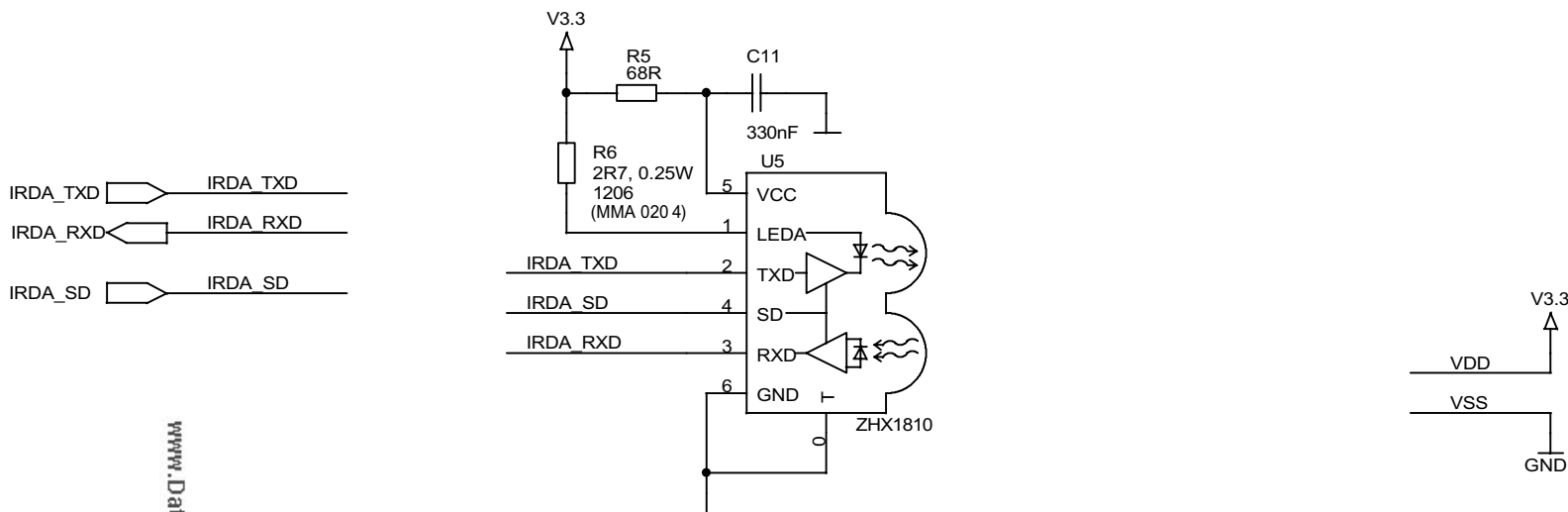


Figure 14. eZ80L92 Module Schematic Diagram, #6 of 9—IrDA Reset

www.DataSheet4U.com

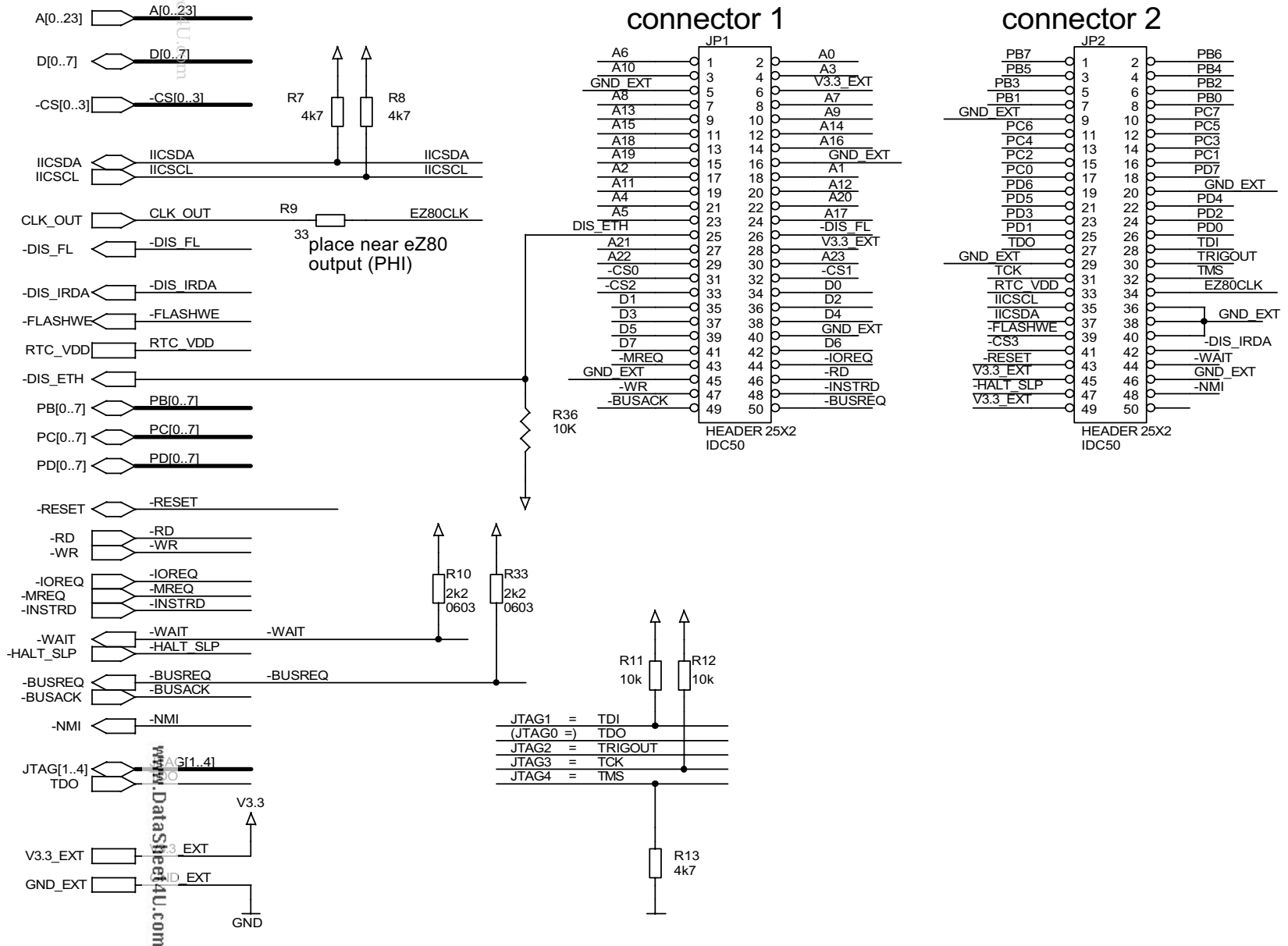
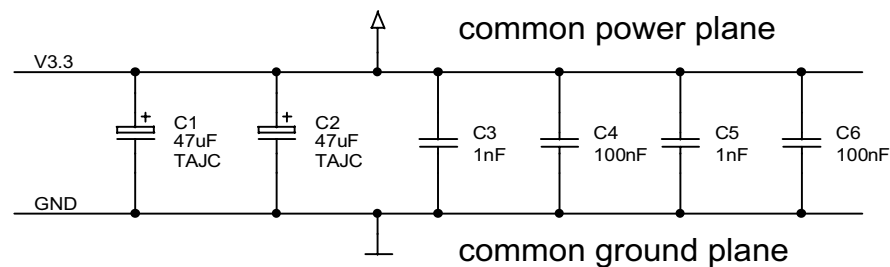
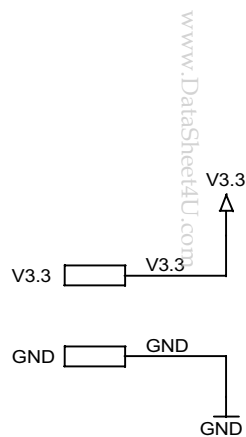


Figure 15. eZ80L92 Module Schematic Diagram, #7 of 9—Headers



no power supply on board!

Input: $V_{DD}(=V3.3) = 3.3V \pm 5\%$

Power: $P_{max} = 1.6W$
 $P_{typ} = 0.4W$

Current: $I_{max} = 200mA$ (IrDA not in use)
 $I_{max} = 460mA$ (IrDA in use)
 $I_{typ} = 100mA$

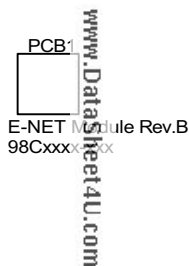
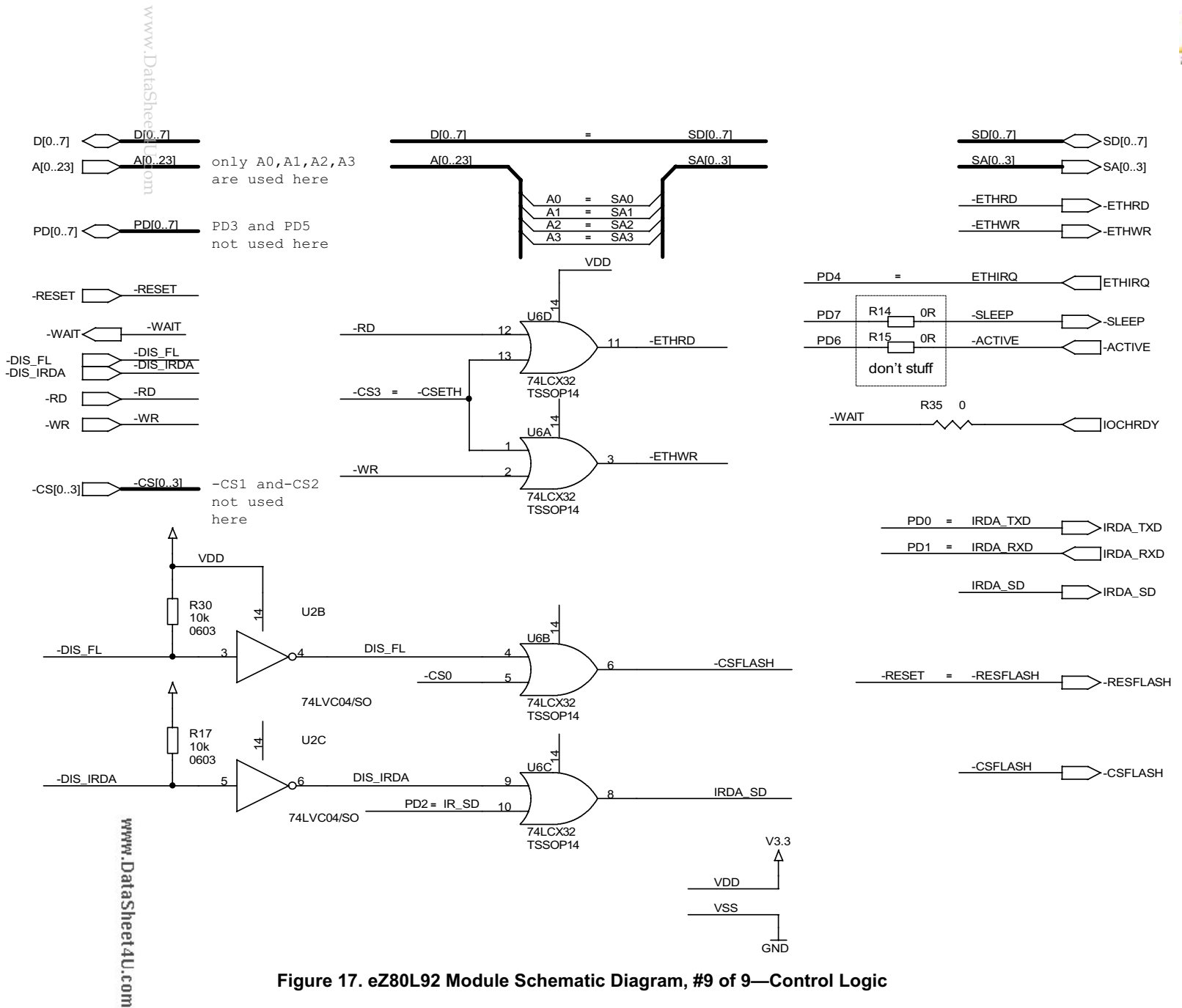


Figure 16. eZ80L92 Module Schematic Diagram, #8 of 9—Power Supply





Customer Feedback Form

The eZ80L92 Module Product Specification

If you experience any problems while operating this product, or if you note any inaccuracies while reading this Product Specification, please copy and complete this form, then mail or fax it to ZiLOG (see *Return Information*, below). We also welcome your suggestions!

Customer Information

| | |
|----------------|---------|
| Name | Country |
| Company | Phone |
| Address | Fax |
| City/State/Zip | Email |

Product Information

| |
|--------------------------------|
| Serial # or Board Fab #/Rev. # |
| Software Version |
| Document Number |
| Host Computer Description/Type |

Return Information

ZiLOG
System Test/Customer Support
532 Race Street
San Jose, CA 95126
Phone: (408) 558-8500
Fax: (408) 558-8536
[ZiLOG Customer Support](#)

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.

www.DataSheet4U.com

www.DataSheet4U.com
