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Embedded - Microcontroller, Microprocessor, and FPGA Modules are fundamental components in modern electronic systems, offering a wide range of functionalities and capabilities. Microcontrollers are compact integrated circuits designed to execute specific control tasks within an embedded system. They typically include a processor, memory, and input/output peripherals on a single chip. Microprocessors, on the other hand, are more powerful processing units used in complex computing tasks, often requiring external memory and peripherals. FPGAs (Field Programmable Gate Arrays) are highly flexible devices that can be configured by the user to perform specific logic functions, making them invaluable in applications requiring customization and adaptability.

Applications of [Embedded - Microcontroller,](#)

Details

Product Status	Active
Module/Board Type	MCU, Ethernet Core
Core Processor	eZ80F91
Co-Processor	-
Speed	50MHz
Flash Size	256KB (Internal), 8MB (External)
RAM Size	8KB (Internal), 512KB (External)
Connector Type	Header 2x30
Size / Dimension	2.5" x 3.1" (63.5mm x 78.7mm)
Operating Temperature	0°C ~ 70°C
Purchase URL	https://www.e-xfl.com/product-detail/zilog/ez80f915150modg

⚡ Warning: DO NOT USE THIS PRODUCT IN LIFE SUPPORT SYSTEMS.

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Revision History

Each instance in the following revision history table reflects a change to this document from its previous version. For more details, refer to the corresponding pages or appropriate links provided in the table.

Date	Revision Level	Description	Page Number
Oct 2013	03	Corrected erroneous part number listed for the eZ80AcclaimPlus! Development Kit, Ordering Information chapter.	<u>17</u>
May 2013	02	Updated to include ordering information for the eZ80F915150MODG and eZ80F917150MODG parts.	<u>17</u>
Mar 2013	01	Original issue.	All

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eZ80Acclaim![™]/eZ80AcclaimPlus![™] Ethernet Modules

Zilog's eZ80Acclaim![™]/eZ80AcclaimPlus![™] Ethernet Modules are compact, high-performance devices specially designed for the rapid development and deployment of embedded systems requiring control and internet/intranet connectivity.

These expandable modules are powered by Zilog's power-efficient, optimized-pipeline-architecture eZ80F91 MCU, a member of Zilog's eZ80AcclaimPlus![™] family. The eZ80F91 MCU is a high-speed, single-cycle instruction-fetch microcontroller that operates with a clock speed of 50MHz. It can also operate in Z80[®]-compatible addressing mode (64KB) or full 24-bit addressing mode (16MB).

The rich peripheral set of these eZ80Acclaim![™]/eZ80AcclaimPlus![™] Ethernet Modules make them suitable for a variety of applications, including industrial control, communication, security, automation, point-of-sale terminals, and embedded networking applications.

Features

Zilog's eZ80Acclaim![™]/eZ80AcclaimPlus![™] Ethernet Modules offer the following features:

- Factory-default operating clock frequency at 50MHz
- 10/100 Base-T Ethernet PHY with RJ45 connector
- 512KB off-chip fast SRAM
- 8MB off-chip NOR Flash memory
- 32Mbit serial Flash memory with SPI interface
- Battery for on-chip Real-Time Clock
- Input/Output connector (J2) which provides 32 general-purpose 5V-tolerant I/O pin-outs
- Onboard connector provides I/O bus for external peripheral connections (IRQ, \overline{CS} , 24 address, 8 data)
- Low-cost connection to carrier board via two 2x30 pin headers
- Small footprint 63.5mm x 78.7mm
- 3.3V power supply
- Standard operating temperature range: 0°C to +70°C

eZ80Acclaim!™/eZ80AcclaimPlus!™ MCU Features

The eZ80Acclaim!™/eZ80AcclaimPlus!™ MCUs offer the following features:

- Single-cycle instruction fetch, high-performance, pipelined eZ80® CPU core
- 256KB of Flash memory and 8KB of SRAM
- 10/100Mbps Ethernet MAC with 8KB frame buffer
- Low power features including SLEEP Mode, HALT Mode, and selective peripheral power-down control
- Two UARTs with independent baud rate generators and support for 9-bit operation
- SPI with independent clock generator
- I²C with independent clock generator
- Infrared data association (IrDA)-compliant infrared encoder/decoder
- New DMA-like eZ80 instructions for efficient block data transfer
- External interface with four chip selects, individual wait state generators, and an external WAIT input pin; supports Intel- and Motorola-style buses
- Flexible-priority vectored interrupts (both internal and external) and interrupt controller
- Real-time clock with on-chip 32 kHz oscillator, selectable 50/60 Hz input, and separate V_{DD} pin for battery backup
- Four 16-bit Counter/Timers with prescalers and direct input/output drive
- Watchdog Timer (WDT)
- 32 bits of general-purpose input/output (GPIO)
- JTAG and ZDI debug interfaces
- 144-pin BGA or 144-pin LQFP package
- Supply voltage of 3.0 V to 3.6 V with 5 V-tolerant inputs
- Standard operating temperature range: 0 °C to +70 °C

Block Diagram

Figure 1 presents a block diagram of the eZ80Acclaim!TM/eZ80AcclaimPlus!TM Ethernet Module.

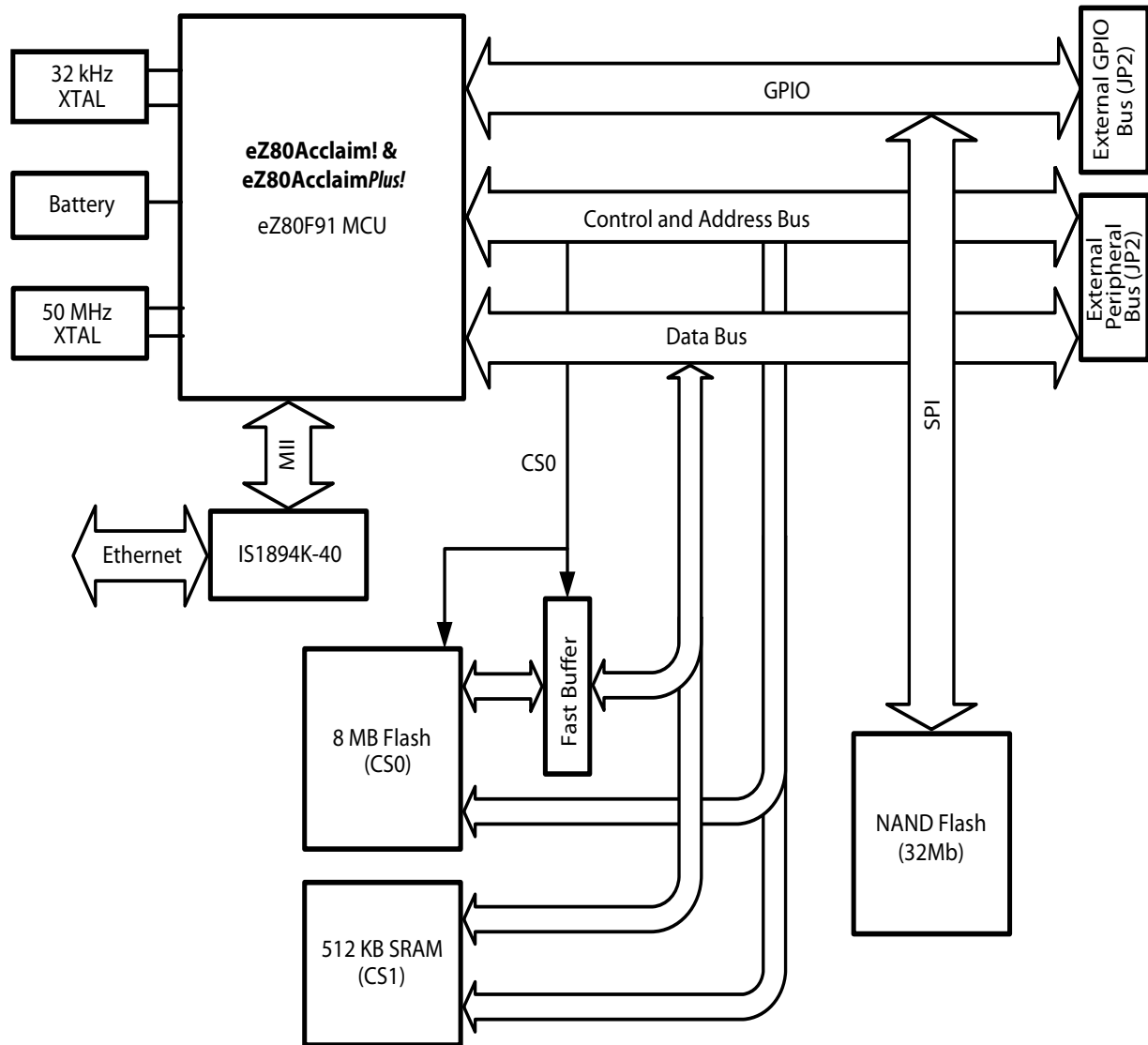


Figure 1. eZ80Acclaim!TM/eZ80AcclaimPlus!TM Ethernet Module Functional Block Diagram

Pin Description

This chapter describes each pin and its signal direction for each of the eZ80Acclaim!TM/eZ80AcclaimPlus!TM Ethernet Module's Peripheral Bus and GPIO connectors.

Peripheral Bus Connector

Figure 2 presents a pin layout of the eZ80Acclaim!TM/eZ80AcclaimPlus!TM Ethernet Modules' 60-pin Peripheral Bus Connector (J1). Table 1 lists the pins and their functions.

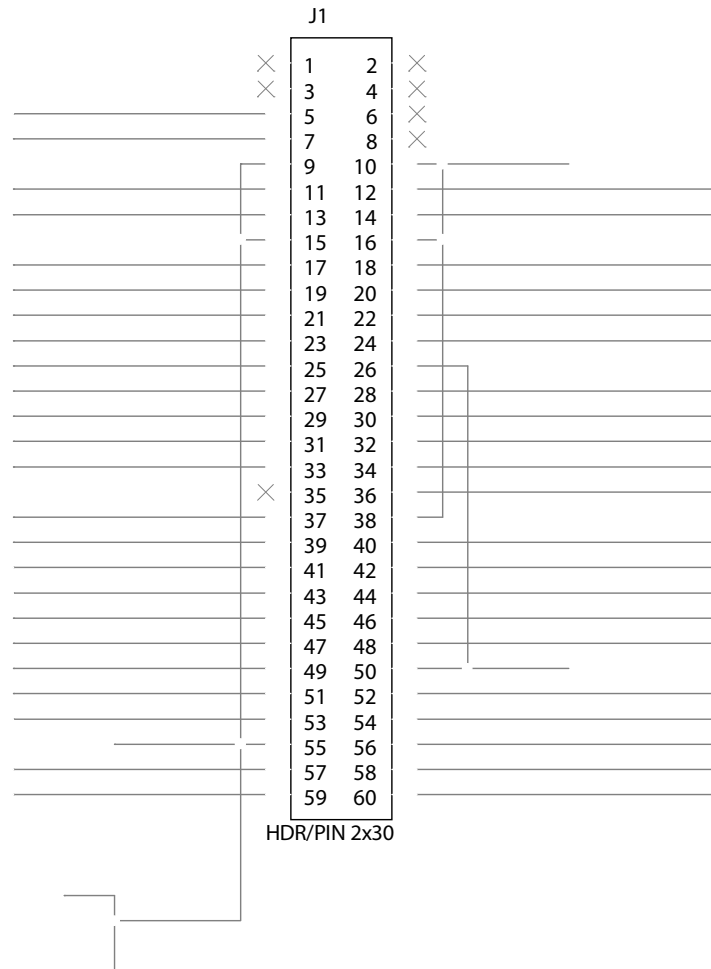


Figure 2. eZ80Acclaim!TM/eZ80AcclaimPlus!TM Ethernet Module Peripheral Bus Connector: J1 Pin Configuration

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

**Table 1. eZ80Acclaim!™/eZ80AcclaimPlus!™ Ethernet Module Peripheral Bus:
Connector Pin Identification**

Pin No	Symbol	Pull Up/ Down	Signal Direction	Comments
1	Reserved			
2	Reserved			
3	Reserved			
4	Reserved			
5	\overline{TRSTN}		Input	Reset for on-chip instrumentation (OCI).
6	Reserved			
7	$\overline{F91_WE}$	PU 10k Ω	Input	A Low enables a write to on-chip Flash memory. If this pin is unconnected, on-chip Flash memory is write-protected.
8	Reserved			
9	GND			V_{SS} /Ground (0V).
10	V_{CC}			3.3V supply input pin.
11	A6		Bidirectional	
12	A0		Bidirectional	
13	A10		Bidirectional	
14	A3		Bidirectional	
15	GND			V_{SS} /Ground (0V).
16	V_{CC}			3.3V supply input pin.
17	A8		Bidirectional	
18	A7		Bidirectional	
19	A13		Bidirectional	
20	A9		Bidirectional	
21	A15		Bidirectional	
22	A14		Bidirectional	

Notes:

- External capacitive loads on \overline{RD} , \overline{WR} , \overline{IORQ} , \overline{MREQ} , D0–D7, and A0–A23 must be below 10pF to satisfy timing requirements for the CPU.
- All unused inputs must be pulled to either V_{DD} or GND, depending on their inactive levels, to reduce power consumption and to reduce noise sensitivity.
- All inputs are CMOS level 3.3V (5V-tolerant), except where otherwise noted.

**Table 1. eZ80Acclaim!™/eZ80AcclaimPlus!™ Ethernet Module Peripheral Bus:
Connector Pin Identification (Continued)**

Pin No	Symbol	Pull Up/ Down	Signal Direction	Comments
49	D5	PU 4kΩ	Bidirectional	
50	GND			V _{SS} /Ground (0V).
51	D7	PU 4kΩ	Bidirectional	
52	D6		Bidirectional	
53	$\overline{\text{MREQ}}$		Bidirectional	
54	$\overline{\text{IORQ}}$		Bidirectional	
55	GND			V _{SS} /Ground (0V).
56	$\overline{\text{RD}}$		Bidirectional	
57	$\overline{\text{WR}}$		Bidirectional	
58	$\overline{\text{INSTRD}}$		Output	
59	$\overline{\text{BUSACK}}$		Output	
60	$\overline{\text{BUSREQ}}$	PU 2kΩ	Input	

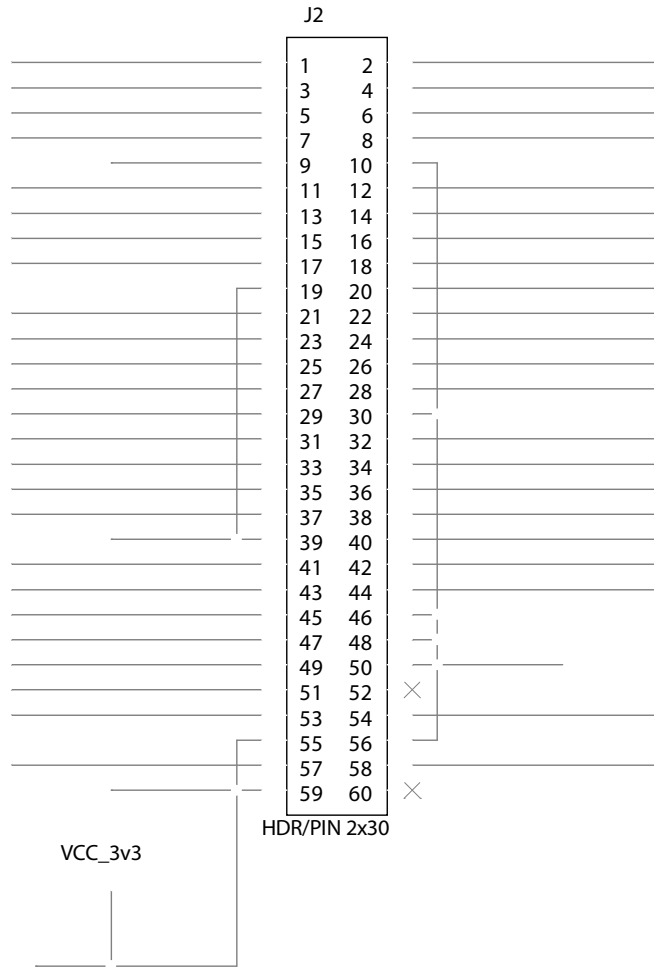
Notes:

1. External capacitive loads on $\overline{\text{RD}}$, $\overline{\text{WR}}$, $\overline{\text{IORQ}}$, $\overline{\text{MREQ}}$, D0–D7, and A0–A23 must be below 10pF to satisfy timing requirements for the CPU.
2. All unused inputs must be pulled to either V_{DD} or GND, depending on their inactive levels, to reduce power consumption and to reduce noise sensitivity.
3. All inputs are CMOS level 3.3V (5V-tolerant), except where otherwise noted.

Input/Output Connector

Figure 3 presents a pin layout of the 60-pin I/O connector (J2) of the modules. However, the eZ80® Development Platform features a 50-pin connector. eZ80Acclaim!™/eZ80AcclaimPlus!™ Ethernet Modules are designed to interface pin 60 of their J2 connectors to pin 50 of the eZ80 Development Platform's JP2 connector so that pins 1–10 of the Modules overlap the edge of the eZ80 development platform. Table 2 describes the pins.

**eZ80Acclaim!™/eZ80AcclaimPlus!™ Ethernet Modules
Product Specification**



**Figure 3. eZ80Acclaim!™/eZ80AcclaimPlus!™ Ethernet Module Input/Output Connector:
J2 Pin Configuration**

**Table 2. eZ80Acclaim!™/eZ80AcclaimPlus!™ Ethernet Module Input/Output Connector:
Pin Identification**

Pin No	Symbol	Pull Up/ Down	Signal Direction	Comments
1	PA7		Bidirectional	
2	PA6		Bidirectional	
3	PA5		Bidirectional	
4	PA4		Bidirectional	
5	PA3		Bidirectional	
6	PA2		Bidirectional	
7	PA1		Bidirectional	
8	PA0		Bidirectional	
9	V _{CC}			3.3V supply input pin.
10	GND			V _{SS} /Ground (0 V).
11	PB7		Bidirectional	
12	PB6		Bidirectional	
13	PB5		Bidirectional	
14	PB4		Bidirectional	
15	PB3		Bidirectional	
16	PB2		Bidirectional	
17	PB1		Bidirectional	
18	PB0		Bidirectional	
19	GND			V _{SS} /Ground (0 V).
20	PC7		Bidirectional	
21	PC6		Bidirectional	
22	PC5		Bidirectional	
23	PC4		Bidirectional	
24	PC3		Bidirectional	
25	PC2		Bidirectional	
26	PC1		Bidirectional	
27	PC0		Bidirectional	

Notes:

1. External capacitive loads on \overline{RD} , \overline{WR} , \overline{IORQ} , \overline{MREQ} , D0–D7, and A0–A23 must be below 10 pF to satisfy timing requirements for the CPU.
2. All unused inputs must be pulled to either V_{DD} or GND, depending on their inactive levels, to reduce power consumption and to reduce noise sensitivity.
3. All inputs are CMOS level 3.3V (5V-tolerant), except where otherwise noted.

**Table 2. eZ80Acclaim!™ /eZ80AcclaimPlus!™ Ethernet Module Input/Output Connector:
Pin Identification (Continued)**

Pin No	Symbol	Pull Up/ Down	Signal Direction	Comments
28	PD7		Bidirectional	
29	PD6		Bidirectional	
30	GND			V_{SS} /Ground (0V).
31	PD5		Bidirectional	
32	PD4	PD 4k Ω	Bidirectional	
33	PD3		Bidirectional	
34	PD2		Bidirectional	
35	PD1		Bidirectional	
36	PD0		Bidirectional	
37	TDO		Output	JTAG Data Output pin.
38	TDI/ZDA		Input	JTAG Data Input pin.
39	GND			V_{SS} /Ground (0V).
40	TRIGOUT		Output	Active High trigger event indicator.
41	TCK/ZCL	PU 10k Ω	Input	JTAG Input. High on reset enables ZDI Mode; Low on reset enables OCI debug.
42	TMS	PU 10k Ω	Input	JTAG Test Mode Select Input.
43	RTC_V _{DD}			RTC supply. For proper operation of the Modules, this pin must be connected to the same power source that powers the module (as it is done on the Zilog® development platform).
44	EZ80CLK		Output	Synchronous CPU clock output.
45	I ² C SCL	PU 4k Ω	Bidirectional	I ² C Bus Clock.
46	GND			V_{SS} /Ground (0V).
47	I ² C SDA	PU 4k Ω	Bidirectional	I ² C Data Clock.
48	GND		Power	V_{SS} /Ground (0V).
49	$\overline{\text{FLASHWE}}$	PU 10k Ω	Input	A Low enables a write to external Flash memory boot block area. If this pin is unconnected, the Flash memory boot block area is write-protected.
50	GND			V_{SS} /Ground (0V).

Notes:

1. External capacitive loads on $\overline{\text{RD}}$, $\overline{\text{WR}}$, $\overline{\text{IORQ}}$, $\overline{\text{MREQ}}$, D0–D7, and A0–A23 must be below 10 pF to satisfy timing requirements for the CPU.
2. All unused inputs must be pulled to either V_{DD} or GND, depending on their inactive levels, to reduce power consumption and to reduce noise sensitivity.
3. All inputs are CMOS level 3.3V (5V-tolerant), except where otherwise noted.

Onboard Component Description

This chapter describes each individual component of the eZ80Acclaim!TM/eZ80AcclaimPlus!TM Ethernet Module.

Logic-Level Input/Outputs

The I/O connector features 32 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 about the eZ80Acclaim!TM MCU, refer to the [eZ80F91 MCU Product Specification \(PS0192\)](#). To learn more about the eZ80AcclaimPlus!TM MCU, refer to the [eZ80F91 ASSP Product Specification \(PS0270\)](#).

Onboard Battery Backup

An onboard Panasonic ML2020 3V Lithium battery powers the 32kHz real-time clock when external power is removed. The battery is charged through diode D2 and resistor R17 when external power is applied to the board.

Ethernet PHY and RJ45 Connector

The Module is equipped with an RJ45 connector with integrated magnetics and two LEDs manufactured by IDT.

Ethernet LEDs

Ethernet activity is indicated by two LEDs located on the RJ45 connector. When the PHY is receiving data, the green LED is ON. When the PHY is transmitting data, the yellow LED is ON.

Fast Buffer (U6)

The eZ80Acclaim!TM/eZ80AcclaimPlus!TM Ethernet Module features a fast buffer (see [Figure 1](#) on page 3) that is used to prevent bus contention that can occur due to slow turn-off time of the module's external Flash memory, and the fast bus turn-around time of the

tion could become corrupted. The part used to isolate a slow Flash data bus from a fast eZ80F91 bus has a 5.5ns turn-off time, which reduces the 25ns duration of the T_{CON} to 5.5ns. As a result, bus contention still occurs, but its duration is not 26.3ns, as described in the following equation:

$$\text{Time of contention} = (8.8\text{ns} - 7.5\text{ns} + 5.5\text{ns}) = 6.8\text{ns}$$

Data being written is not corrupted because the write pulse is not yet asserted.

For more information about bus contention on the eZ80Acclaim!™ MCU, refer to the [eZ80F91 MCU Product Specification \(PS0192\)](#). To learn more about bus contention on the eZ80AcclaimPlus!™ MCU, refer to the [eZ80F91 ASSP Product Specification \(PS0270\)](#).

Memory

The Module's onboard memory consists of the following components:

- U4, CY7C1049: 512KB SRAM with a 10ns access time
- U5, S29GL064N: 8MB NOR Flash with 90ns access time
- U3, S25FL032: 32Mb NAND Flash with an SPI interface

The Module contains external Flash memory, and the eZ80F91 MCU contains internal Flash memory. To allow read/write access to Flash memory on the Module, there are two signals provided, on connectors J1 and J2. A jumper on the module, JP3, enables the programming of on-chip Flash. There is also a signal that duplicates the function of this JP3 jumper. Table 3 indicates the states of the signals and the status of the JP3 jumper for different modes.

Table 3. Flash Memory Programming Signals and Jumpers

Signal/Jumper	Function	State/Status
DIS_FLASH	Controls read/write access to the eZ80Acclaim!™/eZ80AcclaimPlus!™ Ethernet Module for external Flash memory.	When Low, access is enabled
FLASHWE	Controls write operations to the boot block of the eZ80Acclaim!™/eZ80AcclaimPlus!™ Ethernet Module for external Flash memory.	When Low, write is enabled
JP3	Controls write access to eZ80F91 MCU on-chip Flash memory.	When IN, write is enabled
F91_WE	Controls write access to eZ80F91 MCU on-chip Flash memory.	When Low, write is enabled

The external Flash memory space of the eZ80Acclaim!™/eZ80AcclaimPlus!™ Ethernet Module has an access time of 90ns. At least five wait states must be added to the cycle when accessing external Flash at 50MHz clock speed. The eZ80F91 devices on-chip Flash

is faster; its minimum access time is 60ns, which requires only three wait states at 50MHz.

The Modules feature 512KB of fast SRAM. Access time is 10ns, which requires one-wait-state access. The eZ80F91 MCU's on-chip SRAM is used with zero wait states. An additional memory component on the Module is NAND Flash memory with an SPI interface. This 32Mb device is manufactured by Spansion.

Serial Interface Ports

The CPU contains two UARTs with programmable baud rate generators. UART0 is connected to GPIO PD[0:7] on the I/O connector. UART1 is connected to GPIO PC[0:7] on the I/O connector.

► **Note:** Do not connect an RS-232 interface without level shifters. There are no RS-232 level shifters on the eZ80Acclaim![™]/eZ80AcclaimPlus![™] Ethernet Module.

Physical Dimensions

The footprint of each Modules' PCB is 63.5mm x 78.7mm. With an RJ-45 Ethernet connector, the overall height is 25mm, see Figure 5.

Ordering Information

You can order your eZ80Acclaim![™]/eZ80AcclaimPlus![™] Ethernet Module from Zilog or any of Zilog's authorized distributors using the following part numbers. For more information about ordering, please consult your local Zilog sales office. The [Zilog website](#) lists all regional offices and provides additional information about the ZMOTION[®] Detection Module II product line.

Part Numbers

Table 5 lists the part numbers for the eZ80Acclaim![™]/eZ80AcclaimPlus![™] Ethernet Module products and kit, and briefly describes each part.

Table 5. Part Numbers

Part Number	Description
eZ80F915150MODG	eZ80Acclaim! Ethernet Module
eZ80F917150MODG	eZ80AcclaimPlus! Ethernet Module
eZ80F910300ZCOG	eZ80AcclaimPlus! Development Kit

Schematic Diagrams

Figures 6 through Figure 10 displays the layout of the eZ80Acclaim!™/eZ80AcclaimPlus!™ Ethernet Module.

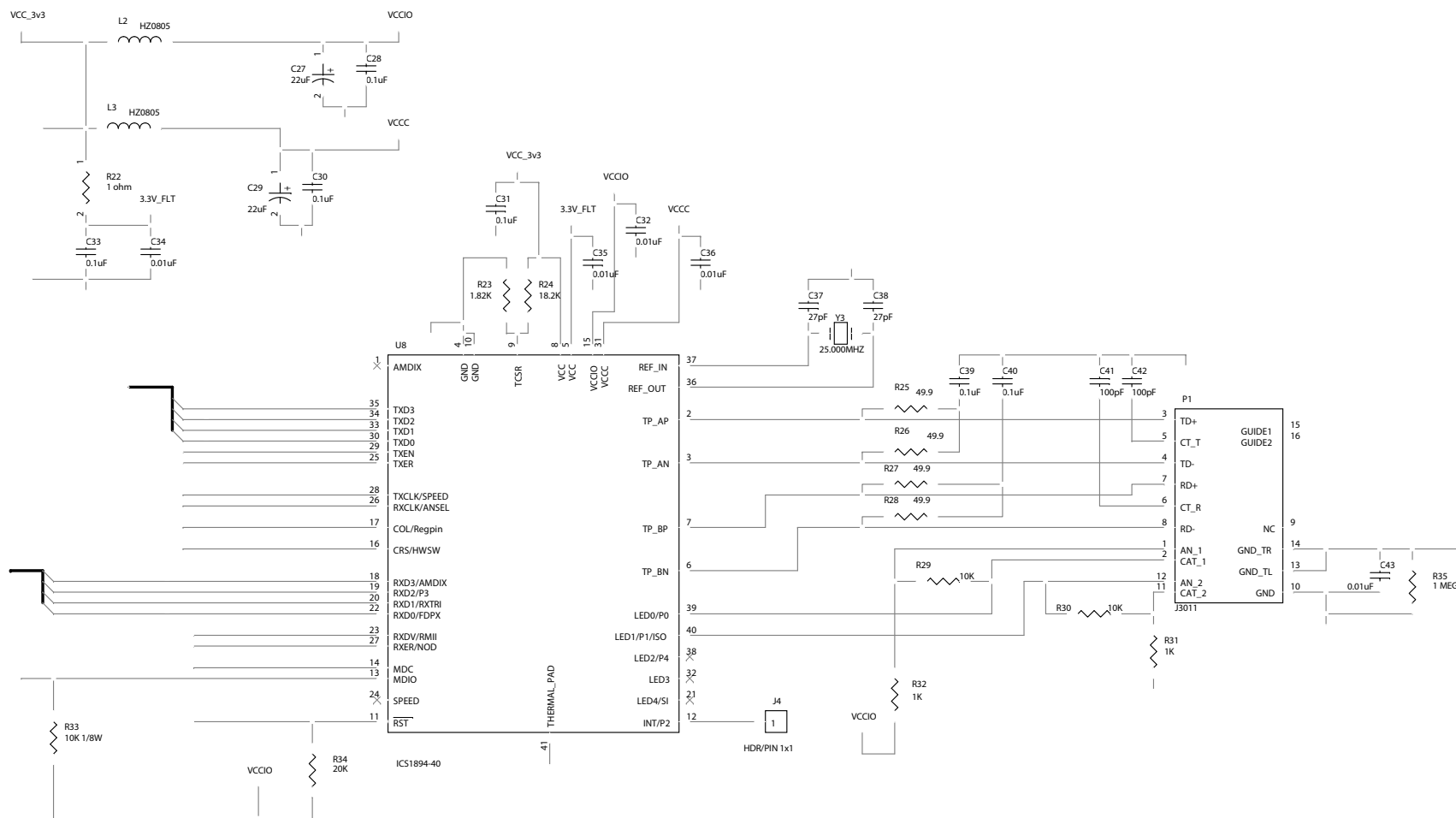


Figure 6. eZ80Acclaim!™/eZ80AcclaimPlus!™ Ethernet Module Schematic Diagram: Ethernet

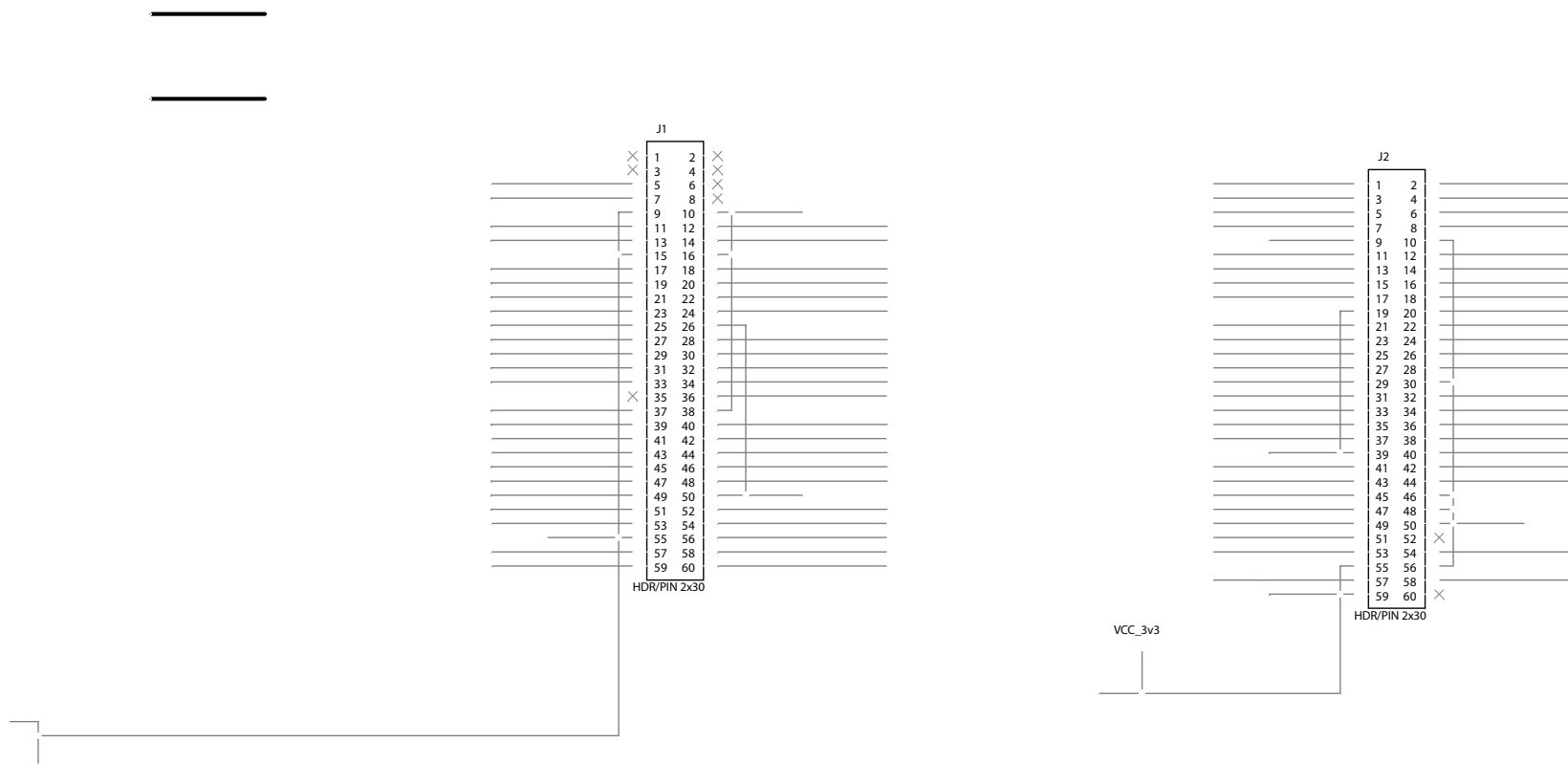


Figure 8. eZ80Acclaim!™/eZ80AcclaimPlus!™ Ethernet Module Schematic Diagram: J1 and J2 Connectors

eZ80Acclaim!™ /eZ80AcclaimPlus!™ Ethernet Modules Product Specification

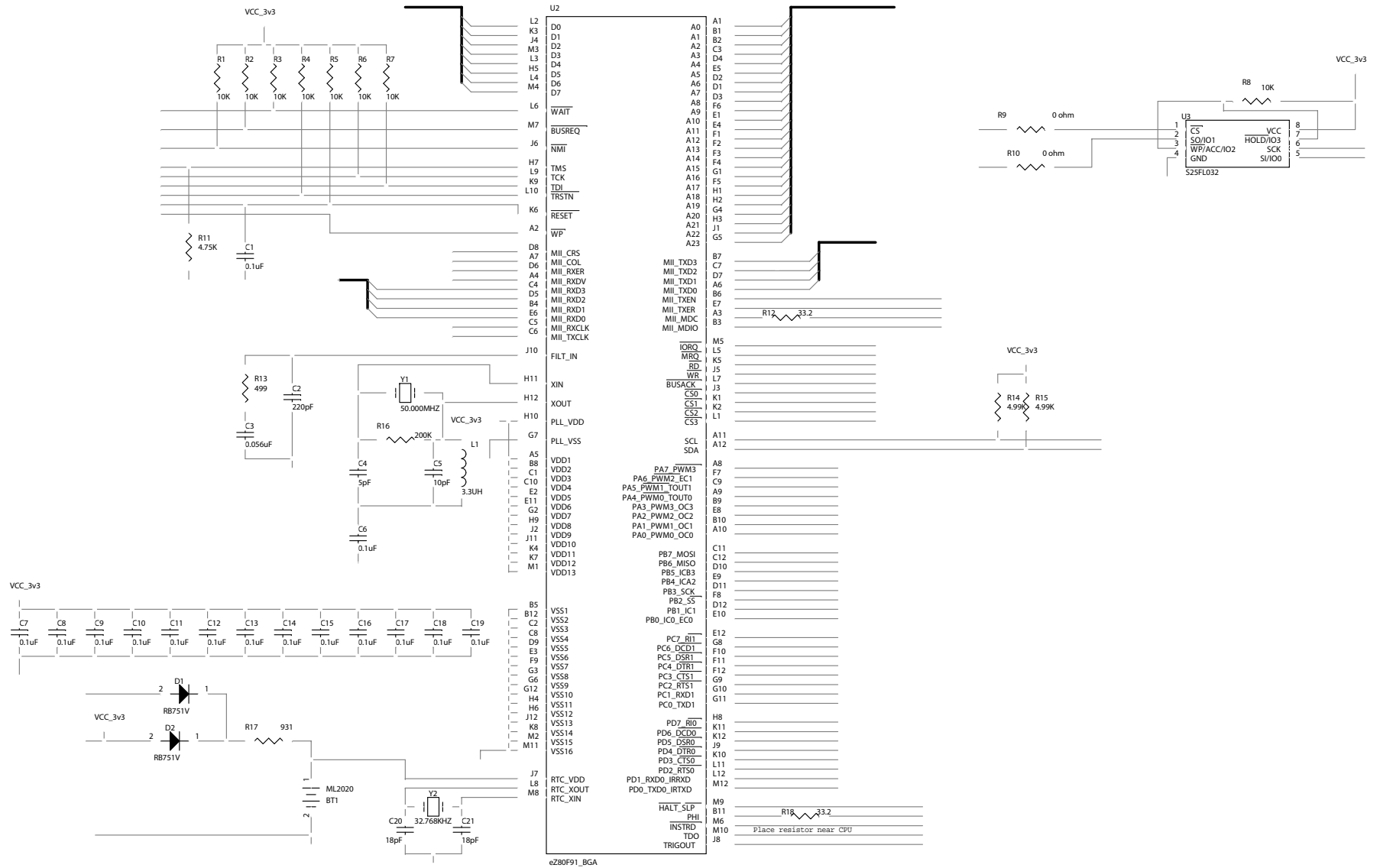


Figure 9. eZ80Acclaim!™ /eZ80AcclaimPlus!™ Ethernet Module Schematic Diagram: MCU