TIGER
Technology Limited

ESP-1
Embedded System Platform

FPGA / SCSI SINGLE BOARD COMPUTER

Featuring:

- Xilinx Virtex FPGA with 5,292 Cells
- Linux Based Operating System
- Wide SCSI, SCSI-2, SCS-3 Interface
- 162 MHz (257 MIPS) Motorola ColdFire CPU
- 74 Programmable I/O & 8-Bit Discrete I/O Port
- 33 MHz PCI Bus, Expandable to three
   additional PCI devices
- 10/100 Mbps Ethernet Connectivity
- Supports 1 GB FPGA Buffer Memory
- Up to 256 MB PC-100 Processor SDRAM
- PC/104 Plus, PCI-Only Compliant
- Up to 32 MB of Flash Memory
- I^{2}C Serial Interface, Two RS-232 Ports
- Integrated Microprocessor Debugger
- Field Upgradeable Firmware

The ESP-1 Embedded System Platform is shown with one SDRAM DIMM installed.

Combining the programmable circuitry of a Xilinx field programmable gate array and the processing power of the Motorola ColdFire 5407 CPU, The ESP-1 Embedded System Platform provides a rapid development platform for custom device interfaces. The 74 fully-programmable I/O pins of the Xilinx FPGA allow for complex logic interfacing and buffering, while providing a bridge to the system microprocessor, which interprets and stores the data on a wide range of media by leveraging the device drivers available for the single board computer's Linux based operating system. Data can be stored on disk, tape, or CD SCSI devices. Network access is available using the onboard 10/100Mb Ethernet adapter, while additional SCSI, IDE, or Fibre Channel devices can be attached to the single board computer's PCI bus to access stored data.

Embedded System Platform   ESP-1
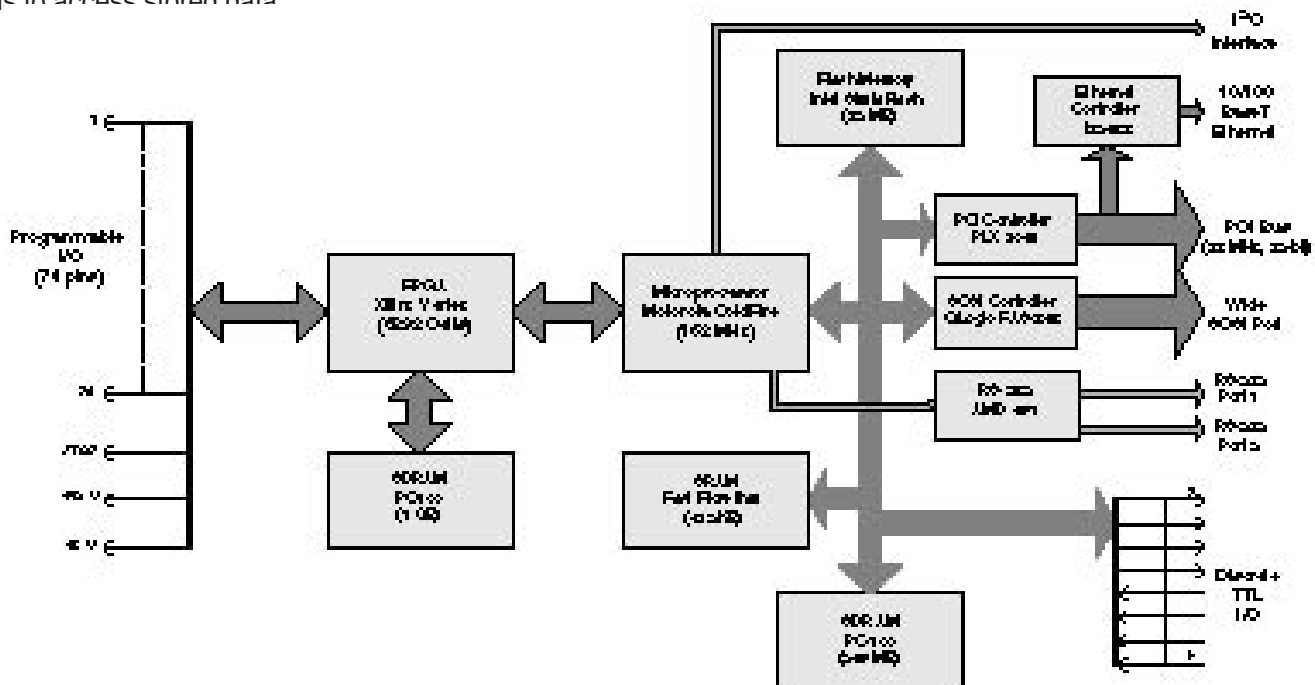
OPERATING SYSTEM

The Embedded System Platform is designed for use with a Linux based operating system. Linux offers a multitasking operating system, capable of real-time operation, while providing the ability to read and write several file system types including DOS and UNIX compatible file storage. Application program development is accelerated by the availability of operating system functions, which manage network and disk operations. Additionally, the network capabilities of Linux provide the ability to remotely access and administer operations and data on the Embedded System Platform.

Microprocessor

The ESP-1 utilizes the MCF5407 Motorola ColdFire embedded processor. The processor connects to a 32-bit, 40 MHz system bus, while internal clock multiplying results in a 162 MHz internal processor frequency. Motorola rates the ColdFire at 257 million instructions per second, in system performance will most likely be lower, however the processor includes 8 KB program cache and 4 KB of user accessible static RAM internally to optimize real world performance. An additional 512 K bytes of static RAM are accessible by the processor externally, allowing the

FPGA

The Embedded System Platform provides 74 programmable I/O pins connected to a Xilinx Virtex field programmable gate array, providing the ability to implement complex logic or bus functions, while allowing dynamic logic changes by reloading the FPGA configuration. The Virtex FPGA offers up to 100 Kb of internal static memory with 5,292 dynamically programmable logic cells, available for creating logic functions, registers, and memory arrays.

The FPGA connects directly to the single board computer's system bus. This allows fast data and status information transfers between the FPGA, CPU, and on board PCI bus, enabling the Arraid unit to act as a bridge between dissimilar systems to SCSI or other storage media.

PCI Controller

The Embedded System Platform includes a PLX 9054 PCI bus master. The 9054 supports a 32-bit, 33 MHz PCI bus, running at 3.3 or 5 volt logic levels. The configuration of the PCI bus master allows 3 additional PCI devices to be added to the single board computer's PCI bus. The PCI bus is designed to meet the PC/104 Plus PCI Only specification, enabling the addition of commercially available PC/104 Plus PCI Only expansion boards.

SCSI Controller

The QLogic FAS368M SCSI controller allows the single board computer to utilize SCSI hard disk drives, tape drives, and CD-ROM devices. The onboard SCSI controller supports SCSI wide devices. Compliance with ANSI SCSI, SCSI-2, and SCSI-3 standards provides data transfer rates ranging from 7 MB per second in Asynchronous mode up to 40 MB per second in Ultra Fast SCSI mode.

Ethernet Controller

On board Ethernet connectivity is provided by an Intel 82558 10/100 Mbps Ethernet controller. This controller supports both the 10 Mbps and 100 Mbps Ethernet standards with support for half and full duplex operation.

SDRAM

The Embedded System Platform supports two PC-100 SDRAM DIMM modules. One DIMM bank dedicated to the processor, the other bank dedicated to the Virtex FPGA. The processor dedicated SDRAM bank provides up to 256 MB of memory for the ColdFire processor's operating system and programs. The Virtex FPGA dedicated DIMM bank supports SDRAM module capacities up to 1GB, providing plentiful buffering of data and translation information.

SRAM

To promote fast program execution and reduced interrupt latency, the single board computer contains two levels of SRAM available to the Motorola ColdFire processor. The first level consists of an internal processor cache of 8 KB cache dedicated to program caching. The remaining 4 KB is available for general use by the processor. The second level of SRAM consists of a 128K by 32-bit flow-through SRAM available for general use in storing commonly accessed program code and data.

FLASH

Nonvolatile memory is provided using Intel StrataFlash memory, with 8 MB capacity expandable to 32 MB. The StrataFlash memory provides reliable long-term memory storage of program and firmware information, with additional automated block erase and block write protect features.

SPECIFICATIONS

Length: 7.32 in., Width: 5.5 in., Height: 2.23 in. Max
(with 3 additional PCI/104 Plus boards attached)

Input Voltages
+12V @ 0.2 Amps Typ
+5V @ 5 Amps Typ