Intelligent Data Acquisition System

Table of Contents

Features

The following are the features of the intelligent data acquisition system:

- HTTP Server: Host web pages from embedded device, featuring SOAP, and CGI interfaces
- Data Acquisition Engine: Capture data and communications from the field
- FTP Server: Manage files and make data available to remote users
- ISaGRAF Engine: Control I/O using this IEC 1131 compliant soft PLC engine
- Includes double-data rate (DDR) memory controller
- Interfaces to MIPS or ARM CPUs. Other CPU interfaces can be added on request.
- Code and data stored in Fusion On-Chip Flash memory
- Security: Design secured with 128-bit AES encryption in Fusion devices
- Low-power design based on Flash FPGA architecture

Applications

The following are the applications of the intelligent data acquisition system:

- Building Automation (security and surveillance)
- Advanced Instrumentation (test and measurement, medical)
- Commercial Transport (truck, marine and aviation)
- Automated Control (manufacturing and processing equipment)
- Consumer Automation (kiosks, vending machines, and ATMs)

Description

The Ultimodule intelligent data acquisition system helps you get a jump start on your system design. It is based on The Microsemi Fusion® field programmable gate array (FPGA), which offers exceptionally high security through its 128-bit AES encryption. This reference design is useful for the web-enabling of the device. The web services features are provided by the Ultimodule runtime software called IDAL (Intelligent Data Acquisition Library). The real power behind IDAL lies in its data acquisition engine. The DAQ engine makes data and local communications available to the internet or local network via TCP/IP. The data acquired from multiple sources can be stored on the Fusion on-chip Flash memory. This nonvolatile storage can be effectively utilized for black-box like applications to recover the data from the FusionFPGA chip.
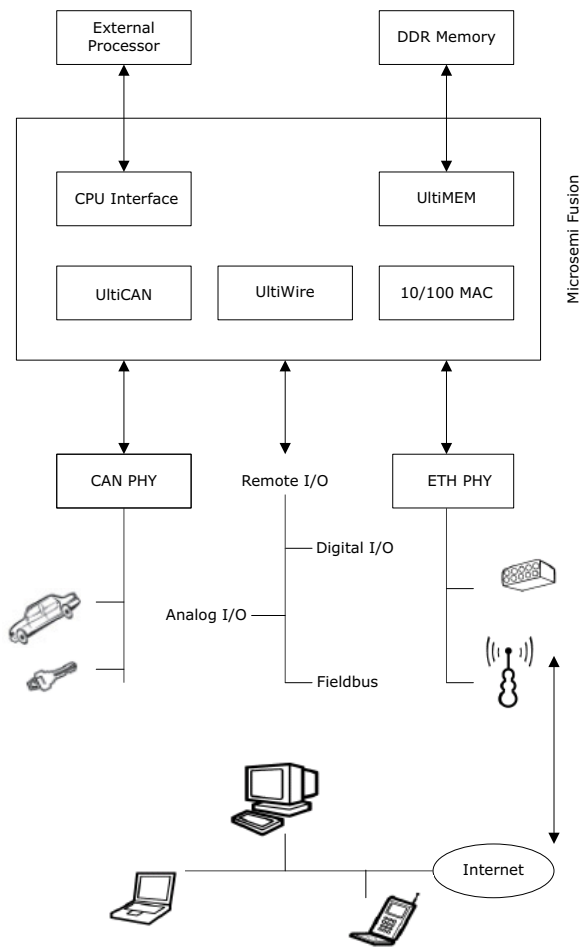
Figure 1 • **Ultimodule System Blocks**

Table 1 • **Ultimodule System Blocks**

System Block	Description
UltiCAN	CAN 2.0B compatible network controller; for automotive and industrial applications. CANOPEN protocol available.
UltiWIRE	48 Mbps single-wire multi-topology I/O bus
UltiMEM	DDRAM memory controller
Core 10/100	10/100 Ethernet core from Microsemi

Ultimodule IPmiX Advantage

Ultimodule pre-packages and pre-tests popular mixes of IP blocks as IPmiX designs. Downloading a selected IPmiX design into an FPGA quickly creates a system solution that is optimized to fit a specific application. Designers can re-use any IPmiX solution and combine with DirectCores and CompanionCores offered by Microsemi. Using Fusion FPGAs also provides numerous benefits: ease of integrating peripheral logic and optimized IP to cut non-recurring engineering (NRE) costs and time to market; avoidance of design obsolescence through a flexible, reusable platform; and ASIC-like singlechip and low power features. Fusion System on Chip (SoC) components that combine analog inputs, on-chip Flash memories, and clock generators with proven Flash FPGA fabric offer multiple component replacement opportunities for overall design cost reduction.

Solution Comparisons

There are several data acquisition ASSP solutions available from multiple vendors. However, the advantage of using the Ultimodule Microsemi-based Flash FPGA solution is the flexibility engineers gain for upgrading, migrating, or replacing products. This especially applies to Fieldbus solutions. Implementing a new Fieldbus in an ASSP centric design which typically requires a board redesign, even if the design is based on a module.

Using the Ultimodule FPGA centric design approach, engineers can implement the new Fieldbus in the programmable FPGA fabric, and add additional hardware (that is, physical layers) on a module.

Examples of Fieldbus and network ASSP devices:

- Philips – CAN 2.0B SJA1000
- Crystal – Ethernet CS8900A
- Cypress – USB 1.1 SL811HST

All the functionalities can be implemented in the FPGA. If the original specification did not require these functionalities, the hardware can be upgraded in later stages to implement the functionalities. The design on the Fusion FPGA can be programmed either on-site or through the remote programming methods. The Ultimodule solution has the advantage that it can be customized to the user requirements and can be easily upgraded.

Advantages

- An integrated solution offering Fieldbus and network connectivity, along with the required software to implement a complete remote data acquisition system.
- An easily customizable solution that allows users to modify and optimize the features to fit their product.
- An upgradeable solution through reprogramming the Fusion devices allows launch of the basic solution initially, and also allows enhanced or upgraded functionalities as new technologies or standards are introduced.
- An obsolescence-proof solution that makes it possible to produce and maintain long-life products. This can be particularly be critical for industrial equipment or instrumentation, where life cycles span for a decade or more.
- Secure programmable chip solution, which consumes considerably lower power compared to other programmable solutions.
- Fusion is an ASIC-like device that is live at power-up. This FPGA consolidates several SoC blocks, enabling mixed-signal programmable design integration.

List of Changes

The following shows important changes made in this document for each revision.

Revision	Changes	Page
Revision 2 (July 2016)	Non-technical Updates	N/A
Revision 1 (December 2005)	Initial Release	N/A

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