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RESEARCH ARTICLE OPEN ACCESS

ARM Cortex for the DAC Framework Using Embedded Web Server

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ABSTRACT
The range of embedded equipment increases daily and when networking technology is incorporated into these equipment, demand will increase further. Embedded network systems have become very important; in particular for industrial devices and domestic devices monitoring and monitoring. HTTP protocol can communicate with larger remote client servers. A hardwired web server with ARM cortex M3 micro-controller is proposed in this article. This 32-bit, 10 X 100 Mbps Ethernet communication is supported by this micro container. Because of the fast running capacity of the ARM processor and because the Ethernet standard can provide reasonable speed Internet access, this system is able to improve safety in industrial conditions by tracking various industrial equipment from a distance where high security and attention is needed. In this paper, we develop an arm cortex microcontroller system for continuous reading of HTTP protocol data, which can be used to monitor and control a variety of devices supporting internet access. This architecture is suitable for a distributed measuring/controlling system and offers scalable networking solutions for education laboratory, instrumentation and even medical applications.
Keywords: Enternet Interface, ARM Context Micro-Controller, LPC 1768, Network Communication, Data Acquisition

I. INTRODUCTION

HIS web server is a computer that saves data on the internet and provides visitors with web pages upon request. Web hosting is called this service. Each web service has a single internet protocol address which indicates where to find the server on the vast web. Every web server has an Internet protocol address. Web host leases space for individuals or enterprises on their web servers and web servers assign a special advertising ad to each website they host. When you connect to the internet, your personal computer will now receive a specific IP address from your internet service provider (ISP). This address indicates the location of the computer on the network. Clicking on the link for a website visitor sends a request to the IP address of his browser. This request provides return details and features like a postal letter that is mailed around the city. The information is then transmitted over a network. The communication goes through a number of machines on the way to this website to get them closer to their final destination.

DCS, based on embedded multiprocessors, is widely used in industrial control as technology of electronic measurement and network commutation has taken great strides. In contrast, built-in acquisition and control facilities and wide range of types are available, though interface protocols are more sophisticated in equipment. It is therefore very important that every automation system vendor has a uniform interface [3].

A person must first have access to the server for any information. Indirect access to the data gathering unit makes the system unattractive when it is necessary to have a direct system interaction with real-time control applications. Additional server maintenance will also increase configuration expenses and maintenance of acquisition systems such as frequent maintenance costs, system upgrades, etc. The central server must always be removed for a sys- tem in real time. This thought can be used in the closet [1]. The suggested system reduces the cost of regularly requested information only and prevents a well-established server from being required.

A silly server is used to optimize the transmission of large amounts of data. The system uses without having to manage extra servers, the user can log in and communicate with the incorporated device in real time [1].

The system is manufactured modularly, allowing the addition of various modules. Moreover, a wide range of measuring instruments with suitable interface can be accommodated flexibly. An embedded web server is a http server running on an embedded system with limited computer resources for web browser service. With the integration of a web server in a network device, a user-friendly,

cheap, cross-platform and network-ready web-based management interface can be created [2].

II. EMBEDDED WEB SERVER ARCHITECTURE

There are three distinct components of the system. The first is the web server Embedded. Secondly, the user or customer and thirdly, the sensors and devices to be tracked. The customer monitors a variety of parameters via sensors and uses the web server to control numerous industrial devices.

An embedded Web server has been created as an ARM processor that includes a software package for the internet, mono and controlling devices/systems. Embedded web servers are part of a network that is embedded. Figure 1 shows the suggested web server DACS idea.

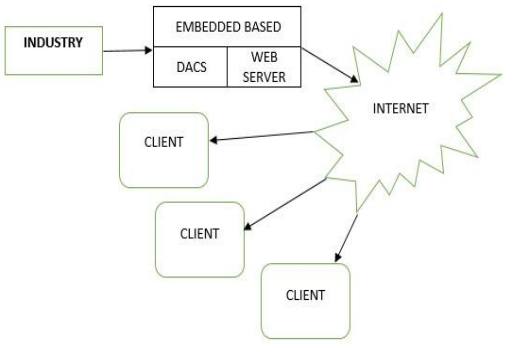

FIG No. 1 : EMBEDDED WEB SERVER ARCHITECTURE

The ARM processor is responsible for signal measurement and remote control of the hardware. DATA mode measurements can be performed by using the embedded web server mode to share data with customers. The operating system administers all functions in real-time such as signal measurement, signals conversion, updating of the database, sending HTML pages, connecting to new users, etc.

Web based user interfaces for management using embedded web servers provide a number of benefits: ubiquity, ease of use, low development costs, and high maintenance. Embedded web servers have distinct needs like low-resource use, high reliability, security, portability and control, which are not suitable for general web server technologies.

III. CREATE A DIRECT LINK BETWEEN THE CLIENT AND THE EMBEDDED DEVICE

For mobile cellular communication, GSM and GPRS are developed. It is also very convenient to connect to the world of the Internet. Upon establishing a GPRS connection, queried data's can be transferred through one central server to the client. There are some dis- benefits to using a central server to relay the acquired data. First, an interface frame for a central server is essential. The supplementary transmission of data is the time delay until the customer makes the data available. Moreover, as the server acts as a relay, no direct two-track communication could be established between the client and the embedded system. That makes the system inappropriate for applications in real-time control. The fundamental concept behind real-time processing is that the embedded system can answer the questions in time. In the context in which the system works and is credible, real time should be quick enough.

The reliability of the real-time system depends not only on the recteness of the logical results but also on the delivery time of the result. This procedure increases the transfer data costs because of the access amount of data transfers through GPRS, as the number of customer's increases. Data preprocessing, on the other hand, allows access to information that is only applicable in the embedded system. The integrated system should also be responsible for the online services. This removes the need for a central server and decreases the amount of data transmitted by the remote device as only the data that has been transferred is transferred.

IV. SYSTEM DESIGN

The architecture and protocols of the proposed system conform to the GPRS system. It is set up to be nearly online in a GSM network at all times. The GPRS connection software module is initiated by an admin script after booting the operating system. A GPRS modem is ready with a PPP connection that works at operating frequencies of 900/1800/1900 MHz. For managing the connections between the client and the embedded module from the PPP network, a PPP (PPPD) daemon is used.

The PPPD set up the GPRS parameters such as connection speed and compression. The IP address of the embedded device should be made accessible to the customer side directly to an embedded system. Two options are available. A static (hard-coded) IP may be used, or by reporting its IP the remote device may initiate the connection. This is an easy and plain decision. While usage expenses remain unchanged, the service provider needs a static IP setup which entails monthly recurring costs any client requiring an embedded server access should be recognized. One way is to send this IP to a stupid FTP server.

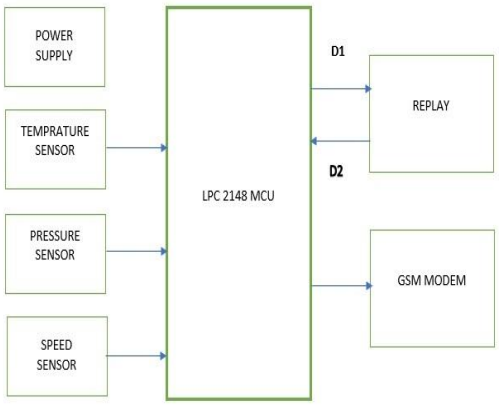

FIG No. 2 : GENERAL STRUCTURE OF THE SYSTEM

The FTP server is stupid and requires no registration or maintenance of extensive software. A script in the embedded device has been configured to update its IP address in the Meta-Language hypertext server as an index.htm file. Simply scan the existing IP of the built-in device and send an html file containing the embedded device IP information to the FTP server. Once the file has been installed, the desired embedded device can be linked directly by a simple query. For example, a basic command querying an embedded system, called DAS, from the FTP server.

In the specialized folder, the web browser processed the file (index.htm) by default; the file name is therefore not required for reference. Despite the need for a script to run on the embedded Server and once broadcasting its IP to the FTP server, the DHCP approach is more versatile and functions best with the static approach as a cost-effective solution. The embedded system updates it on the FTP server for every reboot and provides a refresh of the IP from the GSM service provider with this feature.

V. DATA MANAGEMENT IN THE SYSTEM

The internet server is used to lower the cost for management by delivering the client via an internet server with all images (logo, images, bar graphics etc.). The embedded system would provide text data such as co-ordinates, temperature, and height. The embedded module is only used once to transmit images over GPRS and to place them on an FTP server when voluminous data is sent. This method removes large data transfer through GPRS more than once and thus reduces transfer costs, especially if more than one customer or multiple requests for the same data are involved.

VI. HARDWARE

The general hardware configuration of the ARM-based remote I/O data collection and control system. Provided with 24-hour collection and monitoring networks, and separated from each other, the remote I/O data acquisition and control systems based on the embedded ARM platform are highly universalized. A number of electrical and non-electric signals including current, voltage, power and others can be chosen for each I/O channel. Special ADCs are available for digital acquisition. The data is recorded as a database during web server's mode in the external memory in which the memory is used. The ARM processor supports Ethernet and RS485 communications directly. The data were then saved and monitored via RS485 and Ethernet by any other PCs or networks. The internal I2C module of ARM processor. It is also capable of communicating with other peripherals. In order to create a sample app, an embedded board includes a data acquisition module and a GPRS.

FIG NO. 3 : THE EMBLED SYSTEM'S BLOCK DIAGRAM WITH A BASIC DIVERSION DIAGRAM.

VII. THE PROCESSOR LPS1768

It's an ARM Cortex M3 based microcontroller with a high integration and decreased power consumption for embedded applications. The frequency of CPU processing is 100 MHz with 3-stage pipeline and prefect internal unit. The architecture follows Harvard. It is equipped with a 512 kB flash drive, 64 kB data memory, MAC, USB data port, 8 DMA overhead channels, 4 UART, 2 CAN channels, 2 SSP controls, SPI interface, 3 SSP I2C bus interfaces, 8 ADC 12-bit channels, 10-bit DAC channels, a Real Time Clock with ultra-low voltage, 6-output general purpose pws, four timers and up to 70 general I/O pins.

The ADC has a 12-bit conversion rate of 200 khz. Approach type. For each ADC channel, there are individual results registers to prevent overhead interruption. In addition, burst converting mode for single or multilevel inputs is approved.

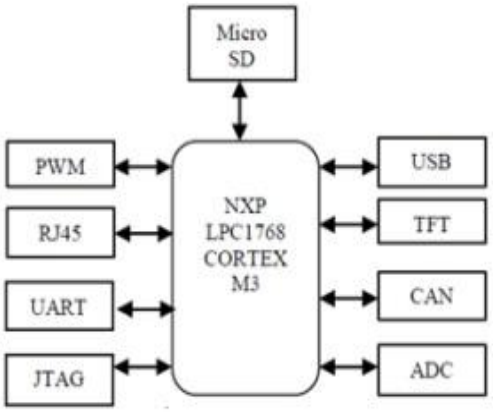

FIG No. 4 : LPC1768 SYSTEM STRUCTURE

Devices are connected via parallel I/O pins, easily and generally. The AHB multilayer bus provides connections to the GPIO registry so you can reach a quickest possible I/O timing.

VIII. SYSTEM SOFTWARE

The hardware coding is written into Keil Program in embedded C language. The layered IEEE 802.3 model TCP/IP is implemented successfully in embedded C language. Keil µ Vision IDE is a basic integrated programming environment (IDE) operating on standard personal computers which offers tools to construct an environment for embedded software that can be quickly implemented and taught. It contains all components that we need for creating, deploying, assembling, and simulating our C / C++ source files. The RTX RTOS kernel library, the application database, Debugger and Analysis software are also available and the device simulation is complete. It also features RTOS and Middleware modules for execution of time-critical applications. It also includes Flash, USB Device and CAN interface. Furthermore The USB port of a PC attaches to the target hardware with Keil adapters from ULINK to JTAG. This allows us to import, validate and debug the final Keil IDE executable hex code for the target hardware. The built-in c code is intended for parameter monitoring and system / instrument management. This machine also has the code for encryption and decryption. The embedded web page is constructed using the HTML or Hyper Text Mark-up Language. For data exchange between the client and the server, the HTML page is used. The HTML page shows the machine/instrument parameter detail. On the desk, you save the HTML tab.

ALGORITHM:

Step 1: To set the clock frequency, initialize the VPDIV register.
Step 2: Start ADC Ports P0.6, P0.7, P0.8 to test the parameters for pressure sensor, temperature sensor and speed sensor.
Step 3: Set the P0.15 and P0.17 ports for computer control relays
Step 4: GSM interface to the ARM processor transmitter and recipient pin.
Step 5: Set the interrupts and activate them
Step 6: Start the endless loop and track the sensor values
Step 7: Encryption and decryption of computer encryption is used.
Step 8: The APN command enables the GPRS attachment.
Step 9: For web page formation HTTP Initialization is completed.
Step 10: Use HTML to build the LOGIN tab.
Step 11: The web page monitors the temperature, pressure and speed parameters.
Step 12: The control action Device ON and OFF can be achieved on the web page.

IX. ETHERNET STANDARD

The Table 1 displays a standard Ethernet frame format. It is made up of seven bytes of preamble and is used for bit syncing. The initial frame limit is a frame flag in the size 1 byte, which means the beginning of the frame. The source and destination addresses are 2 to 6 bytes equivalent to the MAC address of 48-bit. 1500 byte data size is permitted and the 4 Byte frame error checksum that cyclically controls redundancy. The 10 Mb/s or 100 Mb/s Ethernet MAC Ethernet device block, which ensures optimum performance with DMA hardware acceleration. It has a half or full duplex receiving or transmission frame automatically. The Ethernet block communicates between the off-chip PHY and the network serial bus, with the reduced MII protocol. The Ethernet controllers used in network communications in this framework are such functions of filtering received frame, multicast and broadcast support for the transmitting and the receipt of frame, power management through clock switching, auto collision back-off and frame retransmission.

X. CLIENT SERVER COMMUNICATION

It reaches the configured IP address and can monitor the system from the displayed HTML web page, as we saw previously, when the client needs remote access to the devices associated with the server. In the first place, the CRC is done with the checksum bytes before the receipt of data. When the checksum is found to be correct, it now checks whether or not the user is the approved party, matching the password signed in and the password stored in the program. If the user is authorized, the

device now facilitates data collection through the ADC channel. Synchronization of the client server takes place at specific times to obtain the latest information. Figure 6 displays the program flowchart.

XI . HTTP PROTOCOL

Hyper Text Transmission Protocol or the HTTP protocol is the protocol used for communicating between web server and web browser. This protocol specifies all the essential framework of online communications through the handling of requests and the sharing of check information between browser and server. The browser and server can connect to Port 80 in order to obtain a web document.

XII. RESULTS

The effects of ARM Embedded Web Server execution based on DACS are shown in Fig 7 and 8. The seen web pages are checked again by the client and provided by an integrated Web server on ARM. Via this embedded web pages the client will communicate with the computer through his browser. Regulation of each client has been carried out in an unusual manner using the built-in web server.

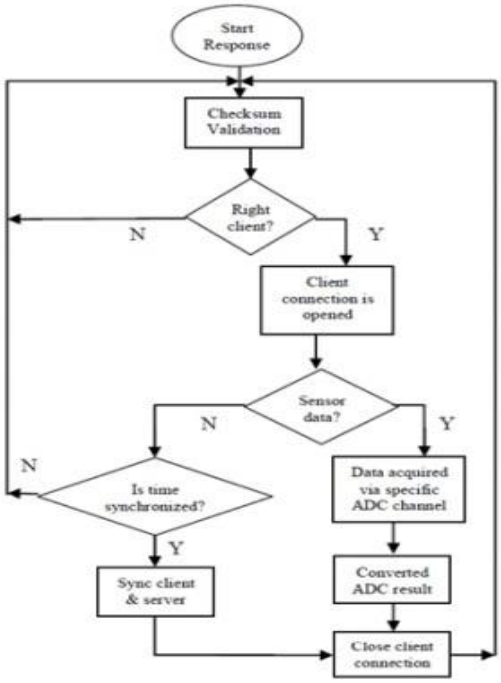

FIG No. 5 : THE FINAL RESULT

XIII. CONCLUSION

A low-cost Internet data collection and control system, which should be of interest to scientists, has been developed and applied in this application. The possible use of modules with a priate interface is nearly infinite, but the use of the framework is demon-laden and only few prototype products can be used. This framework provides benefits relative to other systems for direct two-way communication and overhead elimination, which could be critical for certain real-time applications.

Wireless networking networks which are not previously addressed. The net cost gain of the Sys-TM in the modules used makes the data acquisition applications appealing. The device's power demand is also being increased by placing the appliances in sleep mode at times while not used to save power.

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