

Project Proposal

Bluetooth POS Terminal

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Project Abstract

For my project, I plan to make a simple Bluetooth payment processing system. This system will allow a user to process a payment transaction using their cell phone's Bluetooth connectivity. The system will be composed a Bluetooth controller connected to the Z8 microcontroller. The Z8 will also be connected to a PC via a serial cable. A signal sent from a cellphone via Bluetooth will be processed by the Z8 and after some interaction with the PC, a response will sent back to the cell phone.

The goal will be to simulate a transaction where the phone will identify a user uniquely as a customer and the PC will serve as a central bank database which contains the users account information. During a transaction, a users account will be updated and a confirmation or error sent back to the phone. The Z8 will be the bridge connecting the Bluetooth controller and the PC.

Strategy

In order to achieve this goal I will need several components.

I will need a Z8 microcontroller to process Bluetooth information and handle the transaction data communication.

I will need a Bluetooth controller that is compatible with the Z8 demo board and can process input and output. One that may be a contender is listed here:

http://www.sparkfun.com/commerce/product_info.php?products_id=8461

It draws 3.3v power and has a fully configurable UART.

I will need a cellular telephone which allows me to program and load custom software which allows access to the Bluetooth functionality of the telephone.

I currently own the Sony Ericsson K530i which supports Java ME and the JSR-82 Bluetooth API.

I will also need a PC with some simple data storage and manipulation software to serve as the accounts database.

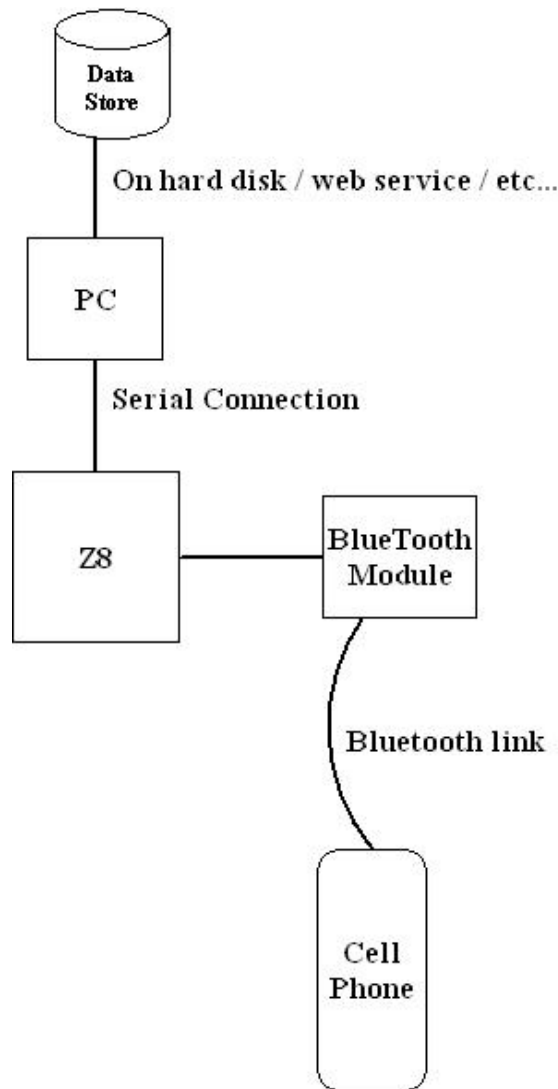
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I will need to program several software modules for each of these components. The Z8 microcontroller evaluation board will need software to handle the input and output to the Bluetooth controller. The microcontroller will also interact via a serial link with the PC to send and receive transaction information.

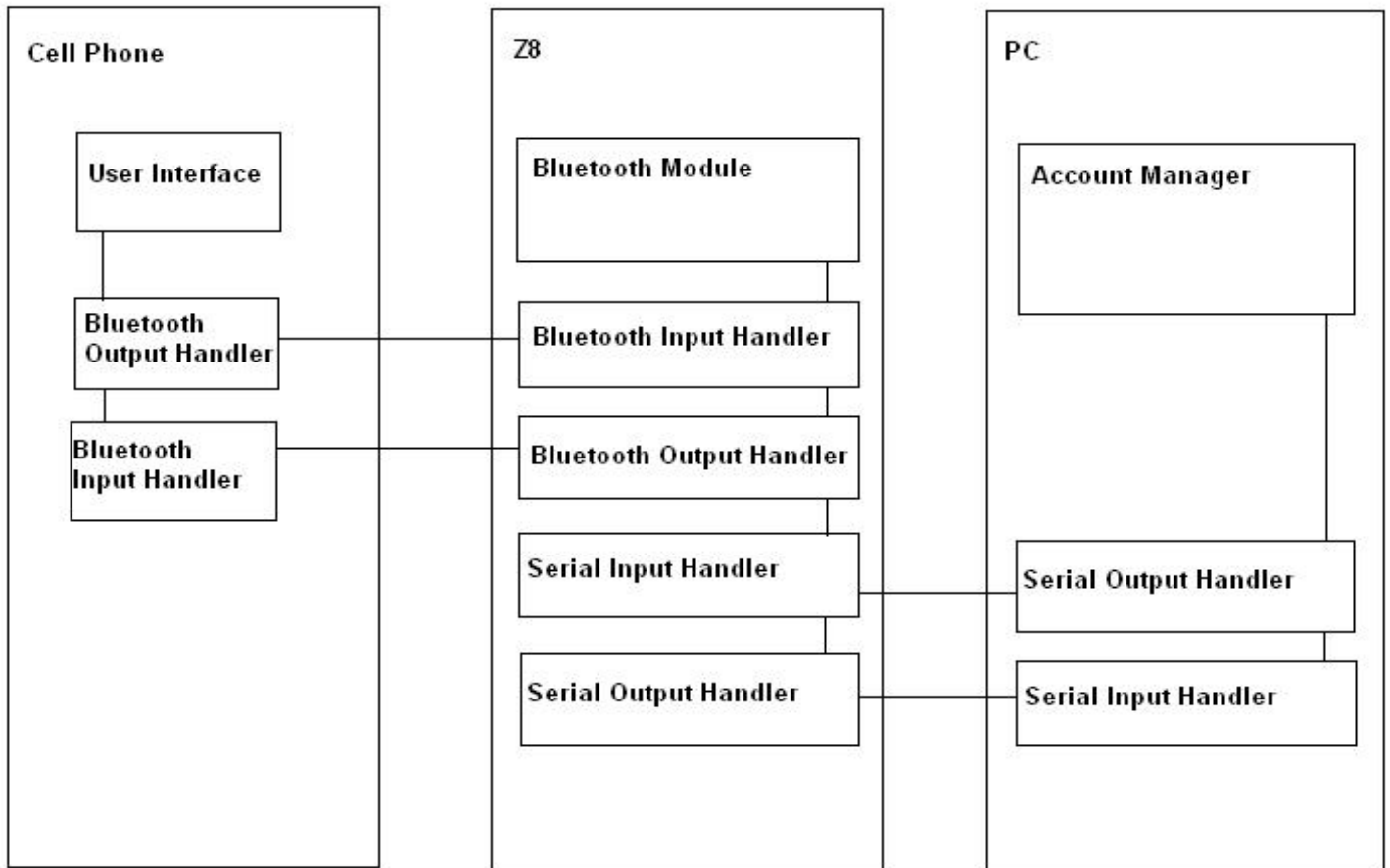
The cell phone will need to be programmed to send and receive Bluetooth communication as well as establish connections and possibly enter identification information.

The Program on the PC will be rather trivial and will simply store and retrieve account information. The most complex part will be to decode / encode the serial input / output.

Preliminary Hardware Block Diagram



Primary Software Block Diagram



Unknowns

The biggest unknown area for me is working with Bluetooth communication controllers. I have never programmed a cell phone and I have never connected any hardware manually. Also, connecting the Bluetooth module will be a challenge for me because I will have to make sure that it is compatible or maybe I will need to make some adjustments to make sure the signals are correct.

Implementation Plan

The first step I will need perform is to test whether I can control the Bluetooth functionality on my phone. I will try to download a sample program for the phone that

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has customized Bluetooth functionality. If there are problems with the phone, I may have to purchase an older model phone that I am certain will work.

The next step is to choose and purchase a Bluetooth module that is compatible with the Z8 board.

I will then run a simple test to send a simple signal from the phone to the Bluetooth module and confirm that it was received. This test will be the major hurdle of this project. Once I am able to create a communication, it will be easier to make more complicated data passing. I will also attempt to send a transmission back to the phone as well. Once I complete this step, I will expand the communication to be more complex to handle the transactions.

The next step to create the system will be to create a communication links via a serial cable to the PC. This will be a way to pass data to the PC so that the account update could be performed. A confirmation or error code will be returned.

The last step will be to actually create the PC system to track the account.

CONSIDERATIONS:

I will have to send a unique identifier from the phone that maps to the account on the PC. If time allows, I may enhance the project so that a PC operator chooses from a set of products for the cell phone wielding customer to pay for. That way it will be more like a POS system. Another Idea is to use the system to transfer “money” between account of two people with cell phones. This would require a more complex software system on the Z8.

Resources

The resources include:

The Z8 board provided by GWU.

A Sony EricssonK530i Cell phone which I own.

A Bluetooth module which I pan to purchase. Possibly this one:

http://www.sparkfun.com/commerce/product_info.php?products_id=8461

A PC, which will most likely be my Dell Latitude laptop which has a serial port.

Cables such as a serial cable and the usb connector for my phone.

The Zilog Development Environment software.

Some Jave ME development kit which I will download.

Possibly additional software.