Design and Specification of a Video Communication Device Based on the Gameboy Advance

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Introduction

Concept: Use the widely available Gameboy Advance (GBA) video game system as the foundation of a portable video communication device.

-The GBA is readily available, sold and used worldwide.

-The GBA provides an LCD screen, ARM7 microprocessor, control pad, and speakers at no additional cost to development and production.

-Development on the GBA is expedited by a wide variety of available, though unofficial, development documentation and utilities.

System Specification
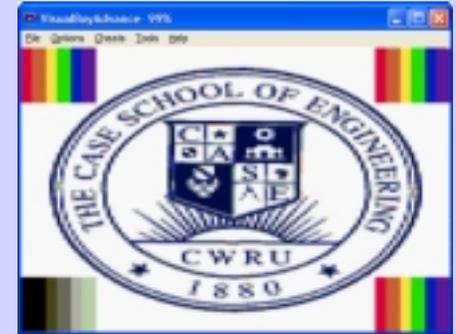
➢Communicate wirelessly with other systems (preferably using Bluetooth standard).

➢Record and transmit full motion video with a resolution of 160x120 to other users, and also to receive and display video from others.

➢Store messages for later retrieval upon a storage medium which is expandable and can be removed for rapid transmission of messages to a personal computer. Messages should be stored when system is idle, thus acting as an "answering machine."

➢Act as a security camera upon request, allowing live video to be viewed from a remote location by a user holding a special PIN.

Design Options

- DSP-based video communicator focusing on 'off the shelf' hardware

- Software-oriented video communicator utilizing existing laptop/PDA technology

- Develop communicator based on Gameboy Advance, utilize hardware from the GBA and instead produce a module which provides additional functionality.

Design Options

•Ease of development and a significant reduction in product cost made the Gameboy Advance module a clear choice for our system.

•Making use of an existing system, such as a GBA or PDA has a clear advantage in time to market. A complete system would take well over a year to develop, while a GBA module could potentially be taken from concept to completion in six months.

•The cost of a Gameboy system is less than that of a PDA which could be used for such a product (only US$70), while still providing nearly all the functionality which would be necessary for a video communicator.

Video Communicator Components

Gameboy Advance System

Developed and sold by Nintendo
Available for less than US$70

Video Communicator Components

Bluetooth / Flash Enabled Card

Developed by X-traFun Inc.
http://www.x-trafun.com/

➢ Bluetooth enabled for connectivity

➢ SD Card Socket for message storage capability

➢ Software can easily be developed to utilize the capabilities of this card from X-traFun.

Market Study

Concern:
By developing a module for the Gameboy Advance, we are limiting our market to existing GBA owners. Thus, the marketability of our product is dependant on the success of Nintendo and of the GBA system.

✓ As of March 24th 2002, Nintendo had sold 5 million GBA units in North America, with an estimated 50 million in world-wide sales

✓ Sales have continued to rise steadily since 2002

✓ Elimination of the LCD screen and microprocessor from our module results in a market price which is far below the original target price for the completed system
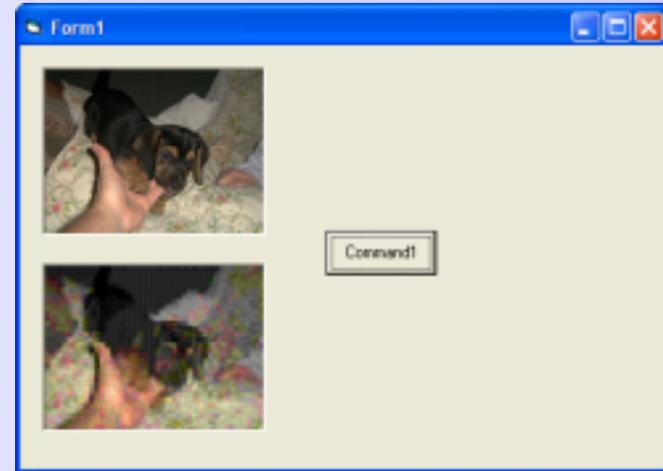
Graphical User Interface: GUI
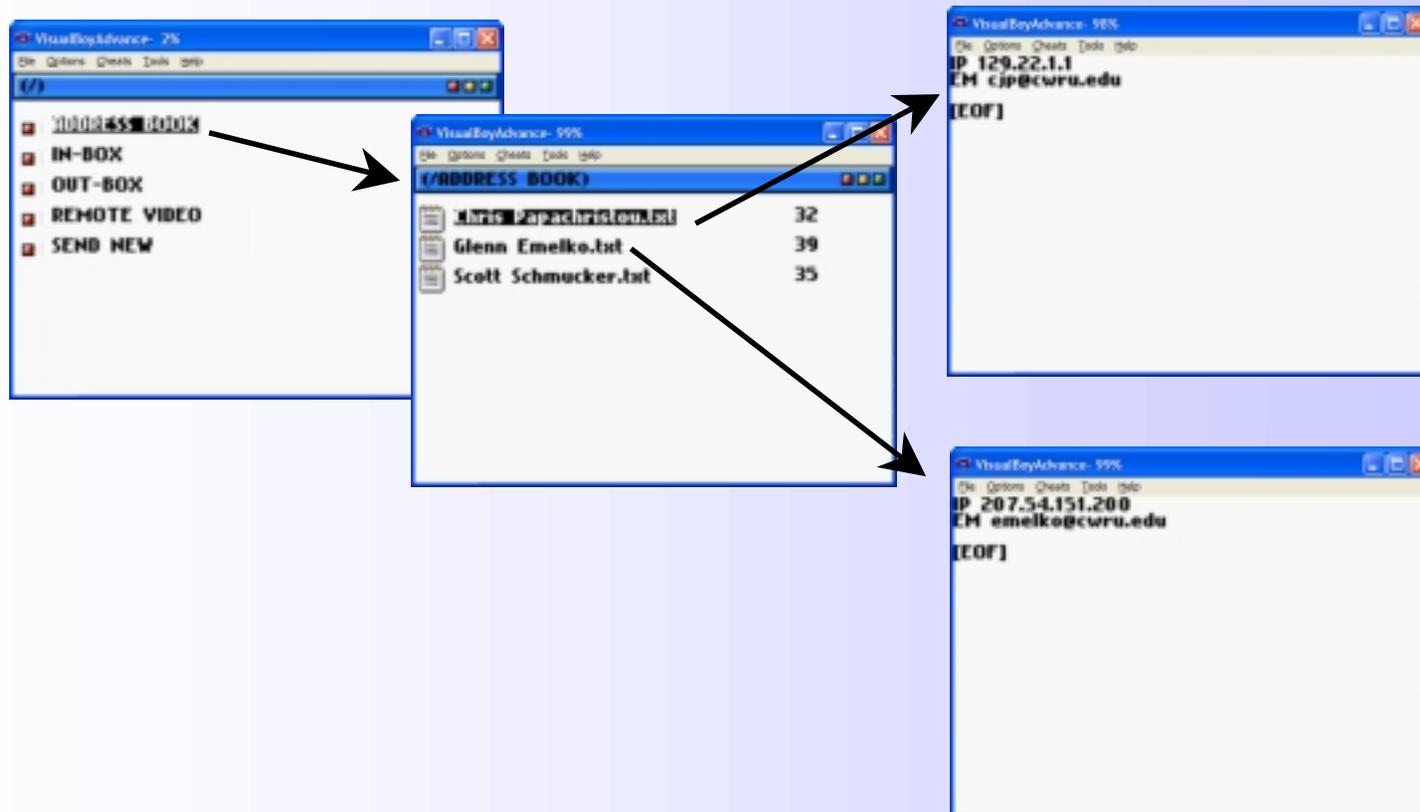
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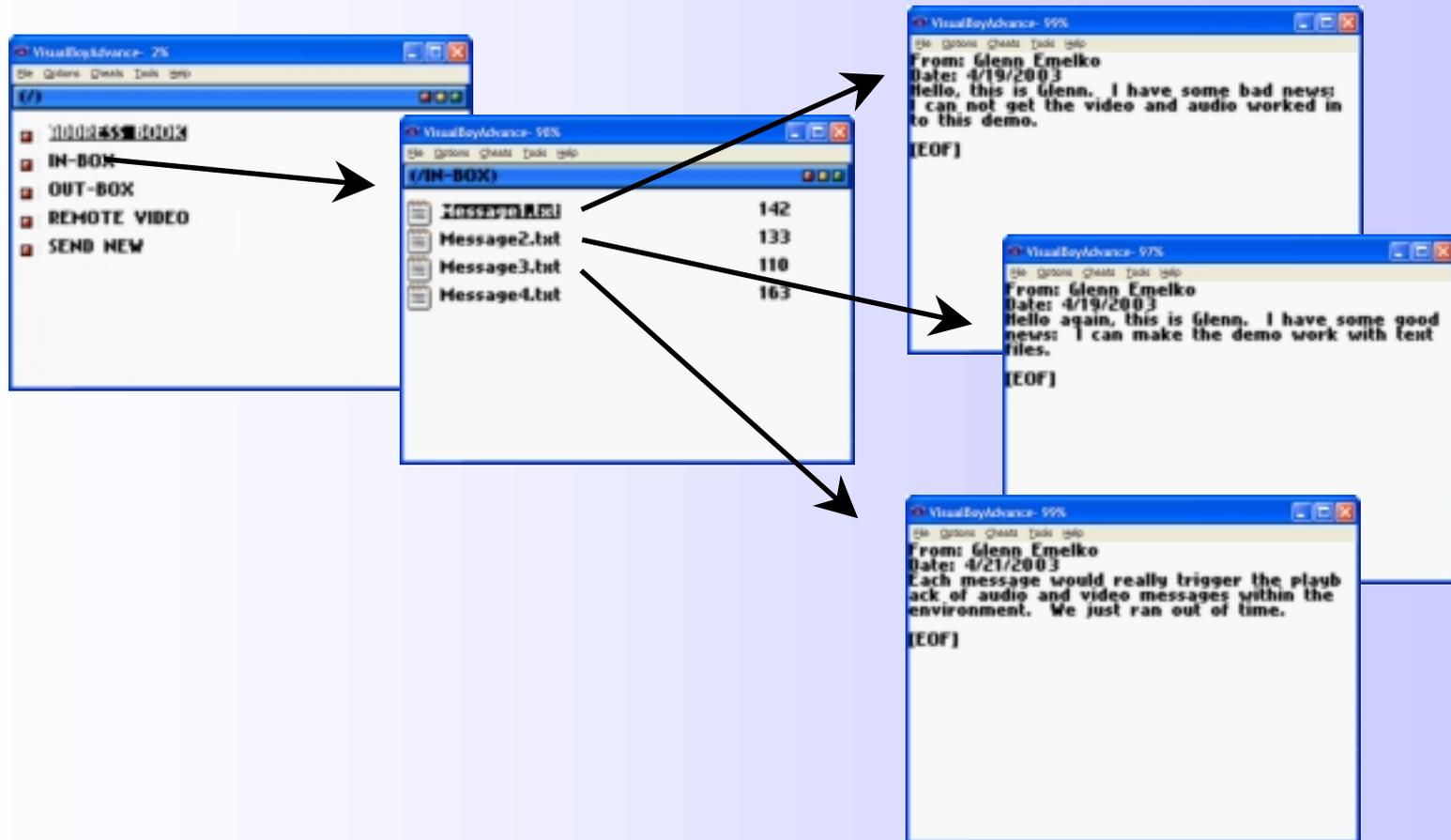
Video Decompression

The ARM7 processor has enough power to do on-the-fly video and audio decompression. We have several demos which show full motion 30 FPS video with audio.

Gameboy games use this capability, although the video usually is comprised of sprites and background graphics. Some games do incorporate small full motion video sequences.

Cartridge Price Estimate (OEM)

- Bluetooth / Flash Cart $ 20.00
- Chip-Camera w/ Mic $ 25.00
- 32Mb SD Memory Card $ 18.00

- Integrated System Cost Total $ 73.00*

      * Does not include non-recurring engineering costs

System Value Estimate (retail)

- Gameboy Advance $ 70.00
- Video Communicator Cart $150.00

- Integrated System Cost Total $220.00

  Based on initial engineering costs of $35,000 to develop a marketable consumer product, we will realize a profit after selling only 500 units. If we sell the units at $100 each, we would need to sell at least 1,300 units to break even.