Track Mate

Initial Design Review

Nathan Beste
Arzhang Badiozamani
Justin Flair
Evan Graves

Professor John Johnson
ECE 189 Fall 2012
Track Mate is designed to fulfill the needs of an athlete on the go. With its on-board GPS, Track Mate will be able to provide to the LCD display information such as distance traveled, average speed, and roughly the number of calories burned. By setting calorie or distance goals beforehand, it will also be able to give feedback on progress and inform the user when he or she has met his or her targets.

Audio feedback will be conveniently combined with Track Mate's secondary function: MP3 playback. Songs will be preloaded onto any SD card, which when inserted will allow the user to construct a playlist or set to shuffle. Basic MP3 player functionality such as play, pause, skip and volume control will be included as well.
Microprocessor: LPC2478

- ARM7 processor running at 72 MHz
- 512 kb on chip flash program memory
- LCD Controller with TFT support
- SD card memory interface
- I2C interface controller for audio decoding
- RS-232 peripheral interface for GPS
- USB 2.0 controller
Micron Technologies MT48LC8M8A2P-6A
● 64MB Density
● 8Mb Depth
● TSOP package
● 166 MHz Clock
● PC133 Data Rate
Specifics: GPS

PMB-648 GPS Module
- 20 parallel satellite-tracking channels
- Power: 3.3V - 5V DC @ 65mA
- Output: NMEA string
- Communications: TTL or RS-232 asynchronous serial @ 4800 bps
- Cold start: 42s (average)
- Warm start: 38s (average)
- Hot start: 1s (minimum)
VS1053 - Ogg Vorbis / MP3 / AAC / WMA / FLAC / MIDI Audio Codec Chip

- I²C interface
- Operates with a single 12-13 MHz or 24-26 MHz clock
- Internal PLL clock multiplier
- 16.5 KiB on-chip RAM for user code and data
- On-chip stereo DAC
- UART for debugging purposes
- 1.8V for digital operations
- 3.3V for analog operations
- 22 mA average
- 75 mA peak
SINT043BTFT-TS Embedded Display Driver Board

- 4.3” 480 x 272 RGB resolution TFT display module
- 8080/6800 MCU Interface
- Built-in 675K byte Frame Buffer
- Solomon Systech SSD1961 LCD controller, supports common RAM-less LCD drivers
- Embedded 4-wire Resistive Touch Panel Control
- Dynamic Backlight Control via PWM Signal
- Power: 1.2V - 3.3V DC
Team

Nathan: Leader, SD Card, SDRAM
Arzhang: GPS
Justin: Display
Evan: Power, Audio
All: Processor
Technology and IP Reuse

- PMB-648 GPS Module
- VS1053 Audio Codec Chip
- SINT043BTFT-TS Embedded Display Driver Board
- Secure Digital Memory
Critical Elements

- Find GPS tracking with a high refresh rate, while balancing power consumption to ensure that calorie and distance information can be as accurate as possible.
- Functional LCD display to output information on burned calorie count, distance travelled, and MP3 details.
- Valid data paths for interfacing all modules through the microprocessor.
Additional Goals

- Implement a heart rate monitor to give the user information about calories burned. This would work with the GPS module using elevation and distance data to calculate a more accurate reading of calories burned.
- Implement the touch screen capabilities of the display.
### Schedule

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