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SMARTWATCH USING EDUARM KIT

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Abstract - EduArm is a ARM cortex-M3 core LPC1768 educational development board . *EduArm has an extensive set of peripherals that allows users to design and build various applications .Smart watch is a device which gives user many more functionalities besides time keeping . In this paper we present the various functionalities which can be added into the smartwatch using EduArm kit . EduArm board is suitable for beginner , intermediate and advanced embedded developers . The smartwatch developed will support various functions similar to that of the ideal or basic smartwatch .*

Key Words: LPC1768, SPI, TFT display, prime framework , Cortex-M3.

1.INTRODUCTION.

EduArm is a ARM cortex-M3 core LPC1768 educational development board . *EduArm has an extensive set of peripherals that allows users to design and build various applications. The most exciting feature of this board is the 2.8" touch screen TFT display screen. The onboard low power audio codec with line in and line out , interfaced with I2S bus provides a complete audio solution for portable device application development. The board also features a low power 3-axis accelerometer with digital output for gaming and other applications. Along with these onboard peripherals EduArm has 2 auxiliary ports which has variety of peripherals like PWM , GPIO , ADC , UART , I2C*
And external interrupt which allows user to extend it's functionality. We will develop functionalities such as to display time to the user , set an alarm for the user , count number of steps walked by the user .

2. FEATURES OF THE EDUARM DEVELOPMENT BOARD.

- EduArm has 2.8" inch 262k color TFT display with 8 bit parallel interface.
- It has onboard touch screen controller using SPI interface .
- SD card connector for data transfer and storage using SPI interface.
- Onboard buzzer for warning and feedback.
- 3-axis accelerometer interfaced using I2C .
- 3.5 mm stereo jack for mic and headphone.
- USB power and programming.
- 5 keypads with 3 user led and power led.
- CAN interface on RJ11 connector.
- Low power audio codec with inbuilt headphone amplifier using I2S interface.
- Reset switch and power button.
- JTAG header for debugging and programming.

3. SPECIFICATIONS.

- Micro controller : LPC1768.
- Onboard crystal for micro controller : 12 MHZ.
- Onboard on chip RTC : 32,768 KHZ.
- Input power supply options: USB , battery and 5V adapter.
- Touch screen controller : ADS7843.
- Audio codec : SGTL5000.
- Audio codec sampling frequency : 8Khz to 96Khz.
- Tft display : 320x240 pixels with real 262 , 144 colors display with ILI9320 display controller.

4. ACRONYMS:

- I2C **:** Inter-Integrated circuit protocol.
- CAN: controller area network.
- SPI: serial peripheral interface.
- UART: universal asynchronous receiver/transmitter.
- GPIO: general purpose input / output .
- PWM: pulse width modulation.

4.OVERVIEW OF DEVELOPMENT BOARD.

Figure -1: EduArm Development Board

5. PROPOSED METHODOLOGY AND IMPLEMENTATION.

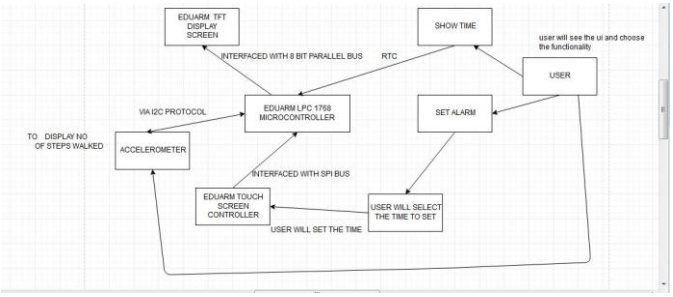


Fig -1: Block Diagram of our system

1. USER:

User will be able to see the functionalities like to display time , set an alarm or to use accelerometer on the UI developed which will be displayed on EduArm display screen.

2. SHOW TIME:

This feature will be implemented by using the RTC module in the LPC1768 micro controller. User will also see day , month , year along with time .

3. SET ALARM :

User can set the alarm on the watch. This feature will be implemented by using RTC module in LPC1768 micro controller which is embedded in EduArm development board.

4. Accelerometer

User will use this feature to count number of steps walked by him. This feature will be implemented by using 3-axis accelerometer which is inbuilt in LPC1768 micro controller.

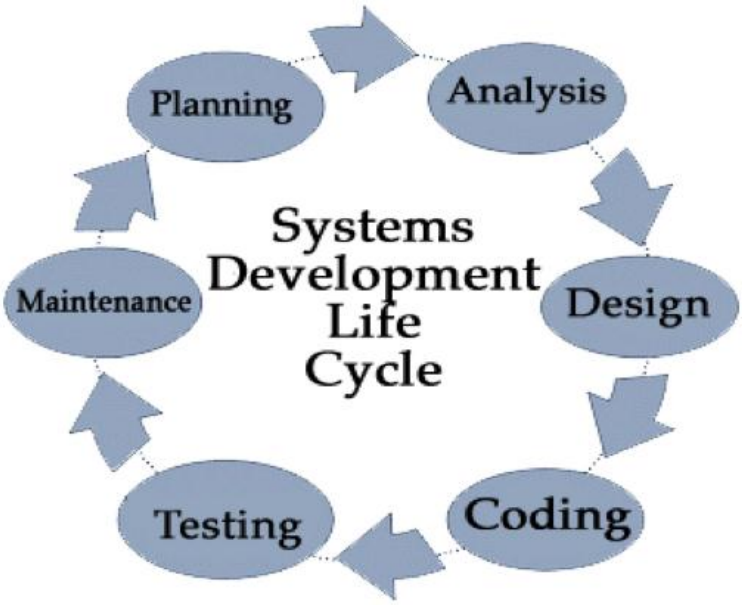
5. LPC1768 Micro controller.

User on selecting the functionality which he wants to use will be processed to the micro controller which has code embedded into it for the required functionality. The micro controller will provide the result of the users request and will display it on TFT display screen.

6. EduArm Touch Screen Controller

For setting an alarm user will have to input the desired time which he wants to set it as alarm. The time will be taken as a input through touch screen controller on TFT display screen which is interfaced with SPI bus .

SOFTWARE DEVELOPMENT AND PARADIGM.



Since SDLC is a risk driven process we have adopted this as a methodology for our project. In our project first we have to analyse the usage of EduArm Development Board and then design the User interface to interact with the user. After designing UI it is necessary to code the functionalities which are mentioned in the UI. After coding we have to test whether the output of the particular functionality is being reflected on EduArm TFT display screen or not.

7. ADDITIONAL FEATURES.

Since the problem with many smart watches is that there is miscalculation in number of steps. This problem is overcome by the use of 3-axis accelerometer which is precise in calculating number of steps walked by the user. Also the problem of discharging is resolved as EduArm development board has 3 options to power o the board. They are USB , battery and adapter of 5V.

8. CONCLUSION.

Smart watch development on EduArm kit will solve problem of interfacing various sensors to micro controller externally. Thus to reduce interfacing problems many features such as 3-axis accelerometer are inbuilt in EduArm kit Development Board. EduArm kit development board makes use of latest ARM cortex-M3 core lpc1768 micro controller which has touch screen display along with inbuilt RTC chip.

9.REFERENCES

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