Night-Vision Goggle

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**Project Overview**

To discover the unique world that can be found after darkness falls. Night-Vision Goggles are becoming the devices which lead you to an amazing moonless night. In this Final Year Project, we are going to rebuild the night-vision goggle and trying to improve the original one by the following implementation.

- Design a battery recharging circuit
- Design a brightness control circuit
- Design a low-battery detection circuit
- Implement a better interface

**System Block Diagram**

[Diagram with blocks and connections: Rechargeable Battery, Battery Recharging Board, DC – DC Converter, Brightness Control Board, MCU microcontroller, Video Decoder a video processor, T0947XLS-GP video signal processor, Memory, Liquid crystal on silicon a micro display. Connections showing voltages and signals.]

3.3V

13.5V

2.5V

13.5V

5V

Power

Register

RGB signal
Night-Vision Goggle

1. Power supply board

IC MAX1565 Digital Still Camera Power Supply to provide different voltage outputs

Input 3.3V

Output 2.5V, 3.3V and 13.5V for both the display and camera board

2. Display board

Microcontroller unit SST89V54 to control the properties of the output image

Video signal processor T0947 to convert signals and also control the feature of the output image

Video decoder SAA7113H to digitize the CVBS

A composite video input is connected to the camera board

A key pad is connected to control the user interface through the MCU

Connect to the LCD panel with 1280x720 resolution

Achievement

1. Battery Recharging circuit

Fast-Charge IC bq2002T to provide reliable charge termination for battery applications

Input 5V for charging purpose

Charge the battery when its voltage drop to 3.7V

Stop charging when the battery is fully
2. Brightness control circuit

555 Timer NE555 to construct a pulse width modulation circuit
Connect to the LED to control its brightness
Different power signals are sent to LED to provide various brightness
Different power signals are controlled by a variable resistor through the 555 Timer

3. Low-Battery detection circuit

Voltage comparator LM393N to compare the battery voltage with a reference voltage to give particular results
Output 0V when battery voltage is above 3.7V
Output 5V when battery voltage is below 3.7V
Connect to MCU to indicate the battery need to be charged

4. User interface

User menu is implemented by T0947
Shifting, Zooming and Mode-changing function is available in the user menu
Keil compiler is used to implement the code

Conclusion

In this final year project, the night vision goggle was developed successfully. Refer to our Aim and objectives; we believe we had improved the night-vision goggle according to our objectives. For the hardware part, the system also builds in a recharge circuit, a brightness control circuit, and a low-battery detecting circuit. For the software part, it has a better user interface menu, functions like shifting; zooming and mode changing have