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6.111 Final Project Checkoff – Wireless Surveillance System

Video Capture/Display

1. Demonstrate ability to display camera picture on monitor using VGA

2. Demonstrate ability to read image data from memory and display image on monitor

Encoding/Decoding

3. Do single row x single column vector multiplication and verify result with Matlab

4. Perform 1-D DCT on 8 rows of input vector and verify output using Matlab.

5. Perform 2-D DCT on 8 rows of input matrix and verify output using Matlab

6. Read Image from memory, perform 2-D DCT, and write output to memory. Verify corresponding output with Logic Analyzer and Matlab.

7. Perform 1-D IDCT on 8 rows of input vector and verify output using Matlab.

8. Perform 2-D IDCT on 8 rows of input matrix and verify output using Matlab

9. Read Image from memory, perform 2-D IDCT, and write output to memory. Verify corresponding output with Logic Analyzer and Matlab.

10. Verify functionality by connecting Encoder and Decoder, and verify a single 8 pixel by 8 pixel macroblock using Matlab and the logic analyzer.

Wireless Transmission/Reception

11. Demonstrate that the RS232 interface (sender and receiver) is working by connecting the sender and receiver modules and showing the correct I/O signals on the logic analyzer. (These modules may also be connected indirectly through the wireless transmitter/receiver modules to show correct functionality.)

12. Demonstrate that the transmitter control unit is working by connecting the module to a block memory and showing that it serially outputs the full contents of the memory. This can be shown using the logic analyzer and an instantiated block memory module containing sample data.

13. Demonstrate that the receiver control unit is working by connecting it to serial input data and showing that it correctly writes to a block memory.

14. Demonstrate that the wireless transmitter module functions correctly by itself. This can be done by connecting the input of the module to serial data and showing that the received data is the same as the data that is being sent from the lab kit. (Although this doesn't show that the data is being correctly assembled into packets, it does show that the transmitter is correctly receiving data from the lab kit.)

15. Demonstrate that the wireless receiver module functions correctly by itself. This can be done by creating a sample packet (in the C code on the microcontroller) and showing that the module correctly outputs the serial contents of the packet.

16. Demonstrate that the wireless transmitter/receiver modules (coded on the microcontroller on the CC2420DBK) function correctly by sending serial input data to the transmitter and showing that the receiver is able to correctly output the same serial data. This can be shown by the connecting the logic analyzer to both the input of the transmitter and to the output of the receiver and then comparing the values.

System

17. Connect Video Capture, Encoder, Decoder, and Video Display, and verify image quality and display visually.

18. Connect Encoder, Wireless Transmitter, Wireless Receiver, and Decoder and verify output using Matlab and logic analyzer

19. Demonstrate the full functionality of the system (either serially or wirelessly) by showing that video is successfully captured at the camera-end and displayed in grayscale on the VGA monitor at the fixed-end.