Kwan-Truc

Todd Hummel

Travis Reed
Concept
Hardware Components
USB Camera

- Any USB Camera that has a vendor supplied Windows driver should work.
- The Camera will either need to be USB 1.1, or be configurable for a low enough bandwidth.
MCF52221

- 80 pin LQFP
- 128 Byte Flash
- 16K Byte Ram
- USB On-The-Go (OTG) Phy
- 4ch, DMA Controller w/ Timers
- 2ea. Programmable Interrupt Timer
- 4 GPT Timers
- 8ch, 12b ADC
- UART Serial Ports with DMA capability
- QSPI and IIC Ports
- 3.3V operation
M52221DEMO

- Integrated USB BDM
- 40 pin I/O port
- miniUSB Port
- RS-232 Serial Port w/ DB9-S Connector
- ON/OFF Power Switch w/ LED indicator
- RESET switch w/ indicator

- Power Input Selection Jumper
- User Features
  - 3-axis Accelerometer
  - 4 User LED’s w/ enable
  - 2 User Push Switches
  - 5k ohm POT w/ enable
- Connectors
  - RJ-45 Ethernet Connector
  - Type B USB connector
  - DB9 Serial Connector
  - 2.0mm Barrel Power Input
  - 2pos, screw type, terminal block

Specifications:
Board Size 3.0” x 4.0”
Power Input: +5 to +16 VDC,
9VDC typical
WLNG-AN-DP102

- Extended operating temperature range (-30°C to +85°C) and environmental specifications, including shock and vibration tolerance
- Advanced security: WEP (64 & 128 bit), WPA and 802.1x (LEAP) authentication
- Highly integrated 802.11b/g wireless module with radio, base-band & application processor
- Software-configurable 802.11b/g interface
- Configurable serial, digital & analog I/O ports
- Integrated RTOS, TCP/IP Stack and CLI
- Reduces need for RF and communications expertise
POWER

Battery Monitor

Will warn you when battery is running low allowing you to land safely.
Laptop

Any plain old laptop with 802.11 wireless will do...
Interfaces
Camera to Processor

- Hardware connectivity will be simple, just a male mini-USB to female USB A adapter.
- The USB “driver” on the processor will only have to set control registers and read memory in order to communicate over the USB bus.
- The processor reference manual claims to support full speed USB transfers of 480 Mbps.
Processor to Transceiver

- Physical connection achieved via 4-wire Serial Peripheral Interface bus.

- The wireless transceiver must be configured correctly for using its built-in SPI port.

- Then, the processor must be programmed to send data to the wireless transceiver.

- Once the data is sent to the wireless transceiver, it is automatically packaged and sent across the 802.11 interface.
The hardware interface will be a 2-wire bus, I2C.

The processor will be the bus master and the power monitor chip will be a bus slave.

The driver we write on the processor will simply have to configure the correct control registers and read the result back.
Wireless Transceiver to Laptop Application

- The hardware interface is wireless transmission.
- The software interface involves making a connection and reading the data off the connected socket.
Laptop Application to Camera Driver

- This interface is Software only (the laptop has all the hardware built-in)

- The information from the camera will be fed to a Windows device driver that is capable of finding, loading, and communicating with the camera’s vendor-supplied device driver (assuming it is installed on the laptop).

- This supplied driver will then be able to function as it normally does when the USB camera is plugged in directly to the laptop. Any commands given by the vendor-supplied driver will then be able to flow the other direction as well (back to the laptop application, then to the camera).
Schedule
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Bill of Materials
# Bill of Materials

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Risks
Risks

- Cash flow (some parts are somewhat expensive)
- Base Station Software – Drivers/porting data to Windows
- Lack of RC experience (may necessitate helicopter repairs/hospital visits)