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Weekly meeting, 2/11/2015

Digital Dash

Portland State University
Department of Electrical and Computer Engineering (ECE)

Weekly Progress Report

- Updated Solutions in Proposal
- Project schedule
 - Extended to include Presentation & Poster
- 4D-System Display
 - Ordered
- Custom Board
 - Create schematic
 - Design power supply
- Next Steps
 - Test out program with electric car
 - Start GUI design

Updated Proposal

- Solutions Page
 - Introduction
 - Block Diagram
 - Prototype
 - Hardware
 - Micro-Controller
 - Power Supply
 - Display
 - Software
 - Communication Program
 - User Interface

[Solutions Github Page](#)

Project Schedule

- Gantt Chart updated to include Presentation
 - Schedule adjusted to include
 - Presentation (6/12/15)
 - Poster (6/12/15)
 - Wrap up documentation

4D-Systems Display

- Display Ordered
 - uLCD-35DT
 - 3.5" screen
 - Arduino Starter Kit
 - \$94.16

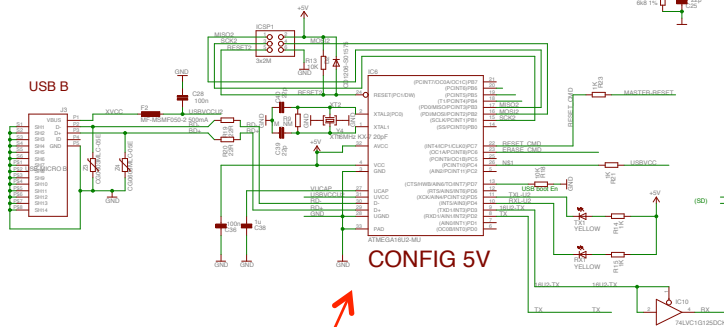
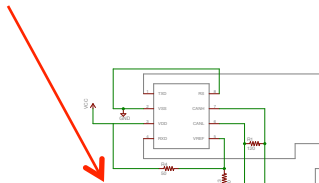


The schematic diagram illustrates the internal wiring of a custom PCB designed for a Raspberry Pi 4. Key components and connections include:

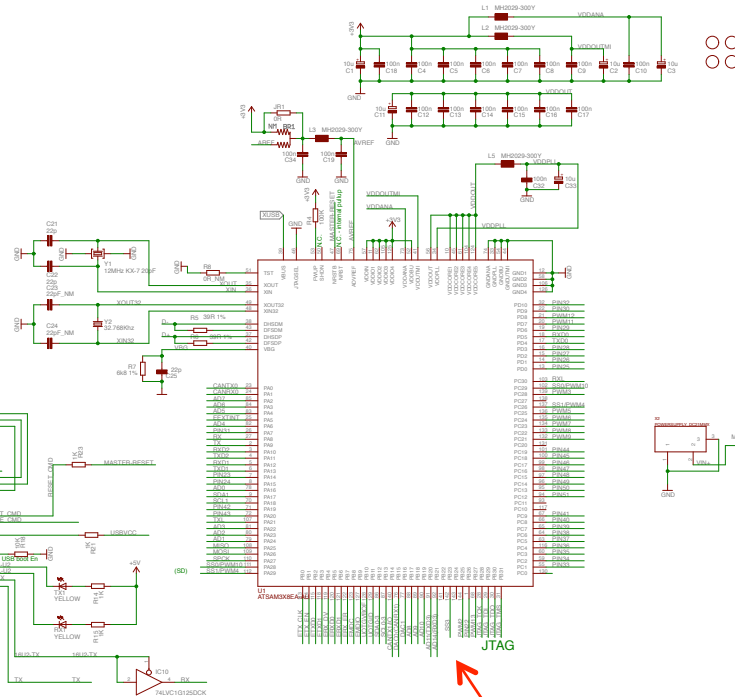
- USB AB and B Connectors:** Located at the top left, these connectors interface with the Raspberry Pi's USB ports. The USB AB connector is labeled "CONNECT USB" and the USB B connector is labeled "CONNECT USB".
- Ethernet Ports:** Two Ethernet ports are shown, labeled "ETH1 (D0)" and "ETH". They are connected to the Raspberry Pi's Ethernet ports via RJ45 modules.
- Power and Ground Connections:** The diagram shows the power supply rails (VCC, GND) and ground connections for various components, including the Raspberry Pi, USB connectors, and Ethernet ports.
- Passive Components:** Numerous resistors and capacitors are shown, with values and footprints specified. For example, resistors are labeled with values like 10K, 1K, 100K, and 10M. Capacitors are labeled with values like 100nF, 1uF, and 10uF.
- Labels and Annotations:** The diagram includes various labels for components and connections, such as "R1", "R2", "C1", "C2", "C3", "C4", "C5", "C6", "C7", "C8", "C9", "C10", "C11", "C12", "C13", "C14", "C15", "C16", "C17", "C18", "C19", "C20", "C21", "C22", "C23", "C24", "C25", "C26", "C27", "C28", "C29", "C30", "C31", "C32", "C33", "C34", "C35", "C36", "C37", "C38", "C39", "C40", "C41", "C42", "C43", "C44", "C45", "C46", "C47", "C48", "C49", "C50", "C51", "C52", "C53", "C54", "C55", "C56", "C57", "C58", "C59", "C60", "C61", "C62", "C63", "C64", "C65", "C66", "C67", "C68", "C69", "C70", "C71", "C72", "C73", "C74", "C75", "C76", "C77", "C78", "C79", "C80", "C81", "C82", "C83", "C84", "C85", "C86", "C87", "C88", "C89", "C90", "C91", "C92", "C93", "C94", "C95", "C96", "C97", "C98", "C99", "C100", "C101", "C102", "C103", "C104", "C105", "C106", "C107", "C108", "C109", "C110", "C111", "C112", "C113", "C114", "C115", "C116", "C117", "C118", "C119", "C120", "C121", "C122", "C123", "C124", 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Custom Board Schematic

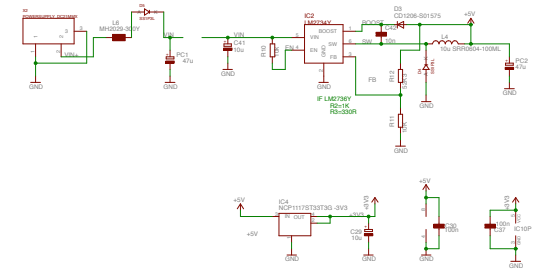
CAN Transceiver



USB Programmer



Power Supply



MicroController

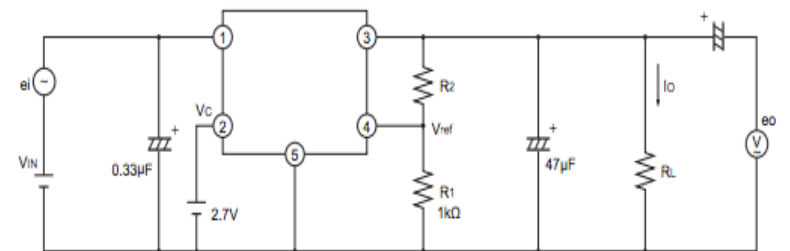
Power Supply

- Current
 - LM2743
 - Switching DC-DC Converter (Noise)
 - Complicated
 - \$2.74 & up (Digi-Key)

- Alternatives

- Fixed Voltage
 - Specific voltages only
- Adjustable (Low Drop Out)
 - Easy To Use
 - Low Noise
 - \$1.50 & up

Fig.2 Test Circuit for Ripple Rejection

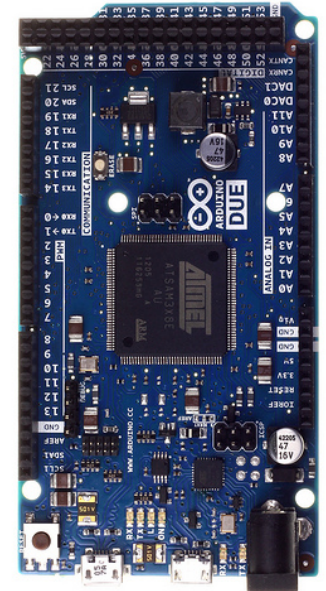


Sharp-070Xz1H

$f=120\text{Hz}$ sine wave
 $e_i(\text{rms})=0.5\text{V}$
 $V_o=3\text{V}(R_1=1\text{k}\Omega)$
 $V_{IN}=5\text{V}$
 $I_o=0.3\text{A}$
 $RR=20\log(e_i(\text{rms})/e_o(\text{rms}))$

Prototyping Progress (update)

- Arduino Due and MCP2551 Transceivers received
- Were able to successfully send CAN messages between CAN0 and CAN1
- Both polling and interrupt versions
- Error codes defined
- Interrupts setup for receiving messages
- Prototype ready for testing with car.



Next Steps

- The 4D systems screen
 - Wait till it arrives
 - Begin laying out GUI using systems IDE
- Documentation
 - Continue both Hardware & Software
- Debug Prototype
 - Test Prototype with actual messages from the car's CAN Buses
- Custom Board
 - Continue schematic capture for new board
 - Begin new board layout