VFD Motor Control

Mackenzie Miller

Andrew Nguyen

Aidan Rader

Ryan Regan

**Interface Control Document**

**subsystem if needed**

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Interface Control Document

for

VFD Motor Controller

Prepared by:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Author Date

Approved by:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Project Leader Date

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John Lusher II, P.E. Date

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[**1.** **Executive Summary** **1**](https://usc-word-edit.officeapps.live.com/we/wordeditorframe.aspx?new=1&ui=en-US&rs=en-US&wopisrc=https%3A%2F%2Ftamucs.sharepoint.com%2Fteams%2FTeam-ECEN-903-403%2F_vti_bin%2Fwopi.ashx%2Ffiles%2F38614161aaa946fdad72880e466a9acc&wdorigin=TEAMS-MAGLEV.teamsSdk_ns.rwc&wdexp=TEAMS-TREATMENT&wdhostclicktime=1726689345265&wdenableroaming=1&mscc=1&hid=168E51A1-0015-6000-5B55-44C59FDE35A8.0&uih=sharepointcom&wdlcid=en-US&jsapi=1&jsapiver=v2&corrid=b6b271d1-cb12-12c8-efcd-1892a5781a2d&usid=b6b271d1-cb12-12c8-efcd-1892a5781a2d&newsession=1&sftc=1&uihit=docaspx&muv=1&cac=1&sams=1&mtf=1&sfp=1&sdp=1&hch=1&hwfh=1&dchat=1&sc=%7B%22pmo%22%3A%22https%3A%2F%2Ftamucs.sharepoint.com%22%2C%22pmshare%22%3Atrue%7D&ctp=LeastProtected&rct=Normal&wdredirectionreason=Unified_SingleFlush#_Toc441585284)

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[3.5. Users 3](https://usc-word-edit.officeapps.live.com/we/wordeditorframe.aspx?new=1&ui=en-US&rs=en-US&wopisrc=https%3A%2F%2Ftamucs.sharepoint.com%2Fteams%2FTeam-ECEN-903-403%2F_vti_bin%2Fwopi.ashx%2Ffiles%2F38614161aaa946fdad72880e466a9acc&wdorigin=TEAMS-MAGLEV.teamsSdk_ns.rwc&wdexp=TEAMS-TREATMENT&wdhostclicktime=1726689345265&wdenableroaming=1&mscc=1&hid=168E51A1-0015-6000-5B55-44C59FDE35A8.0&uih=sharepointcom&wdlcid=en-US&jsapi=1&jsapiver=v2&corrid=b6b271d1-cb12-12c8-efcd-1892a5781a2d&usid=b6b271d1-cb12-12c8-efcd-1892a5781a2d&newsession=1&sftc=1&uihit=docaspx&muv=1&cac=1&sams=1&mtf=1&sfp=1&sdp=1&hch=1&hwfh=1&dchat=1&sc=%7B%22pmo%22%3A%22https%3A%2F%2Ftamucs.sharepoint.com%22%2C%22pmshare%22%3Atrue%7D&ctp=LeastProtected&rct=Normal&wdredirectionreason=Unified_SingleFlush#_Toc441585294)

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[**4.** **Scenario(s)** **4**](https://usc-word-edit.officeapps.live.com/we/wordeditorframe.aspx?new=1&ui=en-US&rs=en-US&wopisrc=https%3A%2F%2Ftamucs.sharepoint.com%2Fteams%2FTeam-ECEN-903-403%2F_vti_bin%2Fwopi.ashx%2Ffiles%2F38614161aaa946fdad72880e466a9acc&wdorigin=TEAMS-MAGLEV.teamsSdk_ns.rwc&wdexp=TEAMS-TREATMENT&wdhostclicktime=1726689345265&wdenableroaming=1&mscc=1&hid=168E51A1-0015-6000-5B55-44C59FDE35A8.0&uih=sharepointcom&wdlcid=en-US&jsapi=1&jsapiver=v2&corrid=b6b271d1-cb12-12c8-efcd-1892a5781a2d&usid=b6b271d1-cb12-12c8-efcd-1892a5781a2d&newsession=1&sftc=1&uihit=docaspx&muv=1&cac=1&sams=1&mtf=1&sfp=1&sdp=1&hch=1&hwfh=1&dchat=1&sc=%7B%22pmo%22%3A%22https%3A%2F%2Ftamucs.sharepoint.com%22%2C%22pmshare%22%3Atrue%7D&ctp=LeastProtected&rct=Normal&wdredirectionreason=Unified_SingleFlush#_Toc441585296)

[4.1. Scenario Name #1 4](https://usc-word-edit.officeapps.live.com/we/wordeditorframe.aspx?new=1&ui=en-US&rs=en-US&wopisrc=https%3A%2F%2Ftamucs.sharepoint.com%2Fteams%2FTeam-ECEN-903-403%2F_vti_bin%2Fwopi.ashx%2Ffiles%2F38614161aaa946fdad72880e466a9acc&wdorigin=TEAMS-MAGLEV.teamsSdk_ns.rwc&wdexp=TEAMS-TREATMENT&wdhostclicktime=1726689345265&wdenableroaming=1&mscc=1&hid=168E51A1-0015-6000-5B55-44C59FDE35A8.0&uih=sharepointcom&wdlcid=en-US&jsapi=1&jsapiver=v2&corrid=b6b271d1-cb12-12c8-efcd-1892a5781a2d&usid=b6b271d1-cb12-12c8-efcd-1892a5781a2d&newsession=1&sftc=1&uihit=docaspx&muv=1&cac=1&sams=1&mtf=1&sfp=1&sdp=1&hch=1&hwfh=1&dchat=1&sc=%7B%22pmo%22%3A%22https%3A%2F%2Ftamucs.sharepoint.com%22%2C%22pmshare%22%3Atrue%7D&ctp=LeastProtected&rct=Normal&wdredirectionreason=Unified_SingleFlush#_Toc441585297)

[**5.** **Analysis** **4**](https://usc-word-edit.officeapps.live.com/we/wordeditorframe.aspx?new=1&ui=en-US&rs=en-US&wopisrc=https%3A%2F%2Ftamucs.sharepoint.com%2Fteams%2FTeam-ECEN-903-403%2F_vti_bin%2Fwopi.ashx%2Ffiles%2F38614161aaa946fdad72880e466a9acc&wdorigin=TEAMS-MAGLEV.teamsSdk_ns.rwc&wdexp=TEAMS-TREATMENT&wdhostclicktime=1726689345265&wdenableroaming=1&mscc=1&hid=168E51A1-0015-6000-5B55-44C59FDE35A8.0&uih=sharepointcom&wdlcid=en-US&jsapi=1&jsapiver=v2&corrid=b6b271d1-cb12-12c8-efcd-1892a5781a2d&usid=b6b271d1-cb12-12c8-efcd-1892a5781a2d&newsession=1&sftc=1&uihit=docaspx&muv=1&cac=1&sams=1&mtf=1&sfp=1&sdp=1&hch=1&hwfh=1&dchat=1&sc=%7B%22pmo%22%3A%22https%3A%2F%2Ftamucs.sharepoint.com%22%2C%22pmshare%22%3Atrue%7D&ctp=LeastProtected&rct=Normal&wdredirectionreason=Unified_SingleFlush#_Toc441585298)

[5.1. Summary of Proposed Improvements 4](https://usc-word-edit.officeapps.live.com/we/wordeditorframe.aspx?new=1&ui=en-US&rs=en-US&wopisrc=https%3A%2F%2Ftamucs.sharepoint.com%2Fteams%2FTeam-ECEN-903-403%2F_vti_bin%2Fwopi.ashx%2Ffiles%2F38614161aaa946fdad72880e466a9acc&wdorigin=TEAMS-MAGLEV.teamsSdk_ns.rwc&wdexp=TEAMS-TREATMENT&wdhostclicktime=1726689345265&wdenableroaming=1&mscc=1&hid=168E51A1-0015-6000-5B55-44C59FDE35A8.0&uih=sharepointcom&wdlcid=en-US&jsapi=1&jsapiver=v2&corrid=b6b271d1-cb12-12c8-efcd-1892a5781a2d&usid=b6b271d1-cb12-12c8-efcd-1892a5781a2d&newsession=1&sftc=1&uihit=docaspx&muv=1&cac=1&sams=1&mtf=1&sfp=1&sdp=1&hch=1&hwfh=1&dchat=1&sc=%7B%22pmo%22%3A%22https%3A%2F%2Ftamucs.sharepoint.com%22%2C%22pmshare%22%3Atrue%7D&ctp=LeastProtected&rct=Normal&wdredirectionreason=Unified_SingleFlush#_Toc441585299)

[5.2. Disadvantages and Limitations 4](https://usc-word-edit.officeapps.live.com/we/wordeditorframe.aspx?new=1&ui=en-US&rs=en-US&wopisrc=https%3A%2F%2Ftamucs.sharepoint.com%2Fteams%2FTeam-ECEN-903-403%2F_vti_bin%2Fwopi.ashx%2Ffiles%2F38614161aaa946fdad72880e466a9acc&wdorigin=TEAMS-MAGLEV.teamsSdk_ns.rwc&wdexp=TEAMS-TREATMENT&wdhostclicktime=1726689345265&wdenableroaming=1&mscc=1&hid=168E51A1-0015-6000-5B55-44C59FDE35A8.0&uih=sharepointcom&wdlcid=en-US&jsapi=1&jsapiver=v2&corrid=b6b271d1-cb12-12c8-efcd-1892a5781a2d&usid=b6b271d1-cb12-12c8-efcd-1892a5781a2d&newsession=1&sftc=1&uihit=docaspx&muv=1&cac=1&sams=1&mtf=1&sfp=1&sdp=1&hch=1&hwfh=1&dchat=1&sc=%7B%22pmo%22%3A%22https%3A%2F%2Ftamucs.sharepoint.com%22%2C%22pmshare%22%3Atrue%7D&ctp=LeastProtected&rct=Normal&wdredirectionreason=Unified_SingleFlush#_Toc441585300)

[5.3. Alternatives 4](https://usc-word-edit.officeapps.live.com/we/wordeditorframe.aspx?new=1&ui=en-US&rs=en-US&wopisrc=https%3A%2F%2Ftamucs.sharepoint.com%2Fteams%2FTeam-ECEN-903-403%2F_vti_bin%2Fwopi.ashx%2Ffiles%2F38614161aaa946fdad72880e466a9acc&wdorigin=TEAMS-MAGLEV.teamsSdk_ns.rwc&wdexp=TEAMS-TREATMENT&wdhostclicktime=1726689345265&wdenableroaming=1&mscc=1&hid=168E51A1-0015-6000-5B55-44C59FDE35A8.0&uih=sharepointcom&wdlcid=en-US&jsapi=1&jsapiver=v2&corrid=b6b271d1-cb12-12c8-efcd-1892a5781a2d&usid=b6b271d1-cb12-12c8-efcd-1892a5781a2d&newsession=1&sftc=1&uihit=docaspx&muv=1&cac=1&sams=1&mtf=1&sfp=1&sdp=1&hch=1&hwfh=1&dchat=1&sc=%7B%22pmo%22%3A%22https%3A%2F%2Ftamucs.sharepoint.com%22%2C%22pmshare%22%3Atrue%7D&ctp=LeastProtected&rct=Normal&wdredirectionreason=Unified_SingleFlush#_Toc441585301)

**List of Tables**

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**List of Figures**

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# **1.** **Overview**

Provide a brief overview of what this ICD will cover (i.e. scope).

# **2.** **References and Definitions**

Provide any references (i.e., standards documents) and definitions. Examples are shown below.

## ***2.1.*** ***References***

## ***2.2.*** ***Definitions***

mA Milliamp

mW Milliwatt

MHz Megahertz (1,000,000 Hz)

TBD To Be Determined

## 

# **3.** **Physical Interface**

Provide details on the physical interface. Examples are:

## ***3.1.*** ***Weight***

|  |  |  |  |
| --- | --- | --- | --- |
| **Component** | **Weight** | **Number of Items** | **Total Weight** |
| **DsPIC33CK** | **TBD** | **1** | **TBD** |

## ***3.2.*** ***Dimensions***

### **3.2.1.** **Dimension of subsystem name**

## ***3.3.*** ***Mounting Locations***

# **4.** **Thermal Interface**

Provide detail on any thermal interfaces that your project may have. Do you need cooling and air circulation? Do you need heatsinks? If you use a heatsink, does it need a cold wall?

It might need a heatsink/fan but does not need a cold wall for the heatsink for the power controller portion

# **5.** **Electrical Interface**

Provide details on the electrical interface. Examples are:

## ***5.1.*** ***Primary Input Power***

The motor being used is 0.25HP producing 186.425W of power. The voltage supplied to the system is 295VDC which is then taken in by the H-bridge to generate a line-to-line voltage of 208V. 15VDC power is supplied to the MCU from the AC/DC power supply fed by the main power. This voltage will be stepped down to 3.3V for the MCU to use.

## ***5.2.*** ***Voltage and Current Levels***

**Maximum values**

|  |  |  |  |
| --- | --- | --- | --- |
| **Component** | **Voltage (V)** | **Current (mA)** | **Power (mW)** |
| **dsPIC33CK** | **3.3V** | **50mA** |  |

## ***5.3.*** ***Signal Interfaces***

## ***5.4.*** ***Video Interfaces***

## ***5.5.*** ***User Control Interface***

# **6.** **Communications / Device Interface Protocols**

Provide details on the protocols for communication. Examples are:

Optoelectronics

The UI used to control the speed of motor

The MCU communication provided by dev board uses (The board is equipped with a USB-UART interface based around the MCP2221A chip. The MCP2221A chip implements the standard Communication Device Class (CDC) – Abstract Control Model (ACM) protocol, and therefore, can use standard USB drivers that are provided with modern Windows®, Mac® and Linux® operating systems.) (6.4)

## ***6.1.*** ***Wireless Communications (WiFi)***

i.e., IEEE 802.11ac

## ***6.2.*** ***Host Device***

i.e., USB 3.0

## ***6.3.*** ***Video Interface***

i.e., HDMI

## ***6.4.*** ***Device Peripheral Interface***

Maybe a serial port (UART) with a custom protocol, in which case you describe the protocol in detail.