

**Navigation BUS Specification**

**AMENDMENT**

Terry Massey

QuadAutomotive Group

9/25/2012

Table of Contents

[Introduction 2](#_Toc336517727)

[Clock Signaling 2](#_Toc336517728)

[Addresses 2](#_Toc336517729)

# Introduction

Initially the Link between the Navigation Unit and the Flight Controller was going to be 4 analog lines where the Navigational Unit would use 4 Digital to Analog converters to alter an Analog voltage there by setting the four Flight control values up for the Flight Controller Offsets. However once work began designing the interface between the two Processors it seemed excessive and prone to error. The conversion between analog and Digital and back introduced a point of failure that is simply unnecessary. Since both the Navigation and Flight Controller units share a board and both processors have plenty of I/O channels to create a parallel I/O Bus passing the digital data back and forth seems to be optimum. So the new setup contains 8 Data Lines, 1 Clock Line and 4 Address Lines. Since we are using only 4 bit addressing we have several options for passing the data in every clock signal. If we use 2 Bytes for each of the values we are only using 8 of the 16 possible addresses. If we use 3 Bytes or 24Bit we use 12 of the 16 addresses. At this point 16 bit resolution should be fine for our needs.

# Clock Signaling

The clock signal acts as a Read/Write status flag. When the clock signal is Low the Navigation Unit is setting the address and Data bus pins. Once the Signal Goes High the Flight Computer can read the Address and Data Pins. Soon as the Clock goes low the Navigation Unit is altering the data and register address.

# Addresses

There are 16 register addresses available on the bus the Table below outlines what register each address is for.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| A0 | A1 | A2 | A3 | DECIMAL | REGISTER |
| 0 | 0 | 0 | 0 | 0 | YAW LSB |
| 0 | 0 | 0 | 1 | 1 | YAW MSB |
| 0 | 0 | 1 | 0 | 2 | PITCH LSB |
| 0 | 0 | 1 | 1 | 3 | PITCH MSB |
| 0 | 1 | 0 | 0 | 4 | ROLL LSB |
| 0 | 1 | 0 | 1 | 5 | ROLL MSB |
| 0 | 1 | 1 | 0 | 6 | THROTTLE LSB |
| 0 | 1 | 1 | 1 | 7 | THROTTLE MSB |