



Raven Installation & Operations Manual



Alpha Systems AOA

Manufactured by Alpha Systems LLC.

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The information contained in this manual is for reference only. If any information contained herein conflicts with similar information contained in the Airplane Flight Manual, the information in the Airplane Flight Manual shall take precedence.

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Raven

Raven RS232 Single Eagle Kit – DSTR-AOA-9300EK-RS232
Raven RS232 Dual Eagle Kit – DSTR-AOA-9300EKD-RS232
Raven RS232 Single Falcon Kit – DSTR-AOA-9300FK-RS232
Raven RS232 Dual Falcon Kit – DSTR-AOA-9300FKD-RS232

Raven ARINC 429 Single Eagle Kit – DSTR-AOA-9300EK-ARINC429
Raven ARINC 429 Dual Eagle Kit – DSTR-AOA-9300EKD-ARINC429
Raven ARINC 429 Single Falcon Kit – DSTR-AOA-9300FK-ARINC429
Raven ARINC 429 Dual Falcon Kit – DSTR-AOA-9300FKD-ARINC429

INSTALLATION/OPERATIONS MANUAL

P# AOA-9050-Raven

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1. GENERAL

1.1 Objective:

There is a lot of information contained in this manual to help explain all steps of installation and help with the FAA required paperwork. This manual is designed to take you step-by-step through the planning, installation, documentation for your Alpha Systems Angle of Attack System. If you follow the instructions throughout the entire process, the installation can be completed correctly the first time.

This manual is intended to describe and guide the installation process of a standard Raven AOA system. However, differences will be outlined to cover a variety of AOA system versions such as: Eagle (Chevron) or Falcon (Bar Graph) in a single or dual display system.

1.2 Background Information by the Numbers:

AC23.1309-1C has a stated objective, ***“to improve the safety of the airplane fleet by fostering the incorporation of both new technologies that address pilot – error and weather-related accidents and those technologies that can be certified affordably.”***

14 CFR part §21.93(a) states in part, ***“a minor change is one that has no appreciable effect on the weight, balance, structural strength, reliability, operational characteristics or other characteristics affecting the airworthiness of the product.”***

14 CFR part §43.13(b) states in part, ***“each person altering an aircraft shall do that work in such a manner and use materials of such a quality, that the condition of the aircraft worked on will be at least equal to its original or properly altered condition.”***

What does this mean?

- The FAA is encouraging modifications that improve operational safety. The Alpha Systems Angle of Attack System is considered to be such a modification.
- A determination needs to be made by the person installing the angle of attack system that it is either a major or minor installation. Alpha Systems believes that installing its angle of attack system in most aircraft is a minor alteration; however, this determination is ultimately the responsibility of the person performing the alteration and returning the aircraft to service.
- Alpha Systems believes that installing its angle of attack system in most aircraft meets the requirements of 14 CFR §43.13(b) if done in accordance with this installation manual, AC43.13-1B, AC43.13-2B and AC23.1309-1D. Again, this determination is ultimately the responsibility of the person performing the alteration and returning the aircraft to service.

1.3 Disclaimers:

Alpha Systems Raven Angle of Attack display system will perform well in a large variety of aircraft. For this reason, the instructions were written in a general format that applies to most aircraft. We understand that the referenced regulations and advisory circulars may not be applicable to all aircraft; however, we feel that they offer excellent guidance for this installation and should be followed.

1.4 Page and Subject Numbers:

Pages in this manual are assigned a two-part page number. The first always specifies the chapter number. The last number indicates the page number. Subjects within a chapter will be numbered with the chapter number followed by the subject number.

1.5 Revisions:

When a revision is required of this manual, the manual will be revised in its entirety.

1.6 Technical Support:

Phone:
763-506-9990

E-mail
flysafe@alphasystems-usa.com

1.7 Warranty Information:

All Alpha Systems AOA products are warrantied to be free from defects in materials or workmanship for a period of TWO, (2) years from the date of purchase. If this Alpha Systems AOA product is proved to be defective within the warrantied period, the exclusive remedy of Alpha Systems AOA / DepotStar, Inc. will, at its sole option, to repair or replace any component that failed in NORMAL use only. Alpha Systems AOA / DepotStar, Inc. is not otherwise liable for installation, removal or shipping costs and is NOT responsible for damage caused by accident, abuse, water, flood, fire, lightning, power surges, installation errors, other acts of nature or external causes. Warranty and support is valid for original aircraft installation.

LIMITATION OF REMEDIES AND LIABILITY: THE WARRANTIES AND REMIDIES CONTAINED HEREIN ARE EXCLUSIVE AND IN LUE OF ALL OTHER WARRANTIES, WHETHER EXPRESSED, IMPLIED OR STATUTORY, INCLUDING ANY LIABILITY ARISING UNDER ANY WARRANTY OF MECHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, STATUTORY OR OTHERWISE. ALPHA SYSTEMS AOA / DEPOTSTAR, INC. SHALL NOT BE LIABLE FOR ANY OTHER LOSSES OR DAMAGES, WHEATHER DIRECT, INDIRECT, SPECIAL, INCEIDENTIAL OR CONSEQUENTIAL REGARDLESS OF THE LEGAL THEORY ASSERTED INCLUDING USE, MISUSE, NEGLIGENCE, WARRANTY OR STRICT LIABILITY.

If you cannot accept these terms, return the complete unit along with the receipt for a refund.

Included in the documentation package is the **Warranty Registration Form**. This form **must** be filled out completely, signed and returned to Alpha Systems AOA LLC. to validate an active product warranty.

1.8 Raven AOA System Overview

Many aircraft have real time AOA information sent the air data or flight data computers **without** giving the pilot the benefit of an AOA display. Other aircraft come equipped with the AOA being displayed however very small, buried down low amongst everything in the PFD. The Alpha Systems AOA **RAVEN** kit was designed to give every pilot in the GA, Commuter, Transport, Commercial or Military aviation communities AOA information, displayed where it's needed in every pilot's peripheral vision.

The Raven AOA system relies on the existing aircrafts' AOA sensing system and repeats or displays the real-time AOA information sent to a PFD or flight data computer making AOA visible for every pilot through highly identifiable AOA illuminated segments for the pilot and copilot in their peripheral vision. This system gives instantaneous AOA information to the pilot without focusing inside the aircraft, down low on the instrument panel. The Raven AOA with the HUD was designed so that the pilot looks through the HUD glass while focusing outside the cockpit environment.

Alpha Systems AOA created the Raven AOA system to read the existing aircraft AOA, **ARINC 429** data stream and give the pilot the ability to add one or Dual Eagle (Chevron styled displays) or Falcon (Bar Graph display) which are mounted in or on top of the glare shield utilizing a HUD (Heads Up Display) reflective system. This system is simple to install with all wiring to the displays prewired through shielded cables. After the system is mounted in the aircraft, there are only four connections,

- 1.) Power,
- 2.) Ground,
- 3.) Two Data connections to the aircrafts' AOA data bus, TX+ and TX-. These connections are protected by the included .250 Amp. fuses.

1.9 Specifications

Unit System Power: 12 Vdc to 28 Vdc

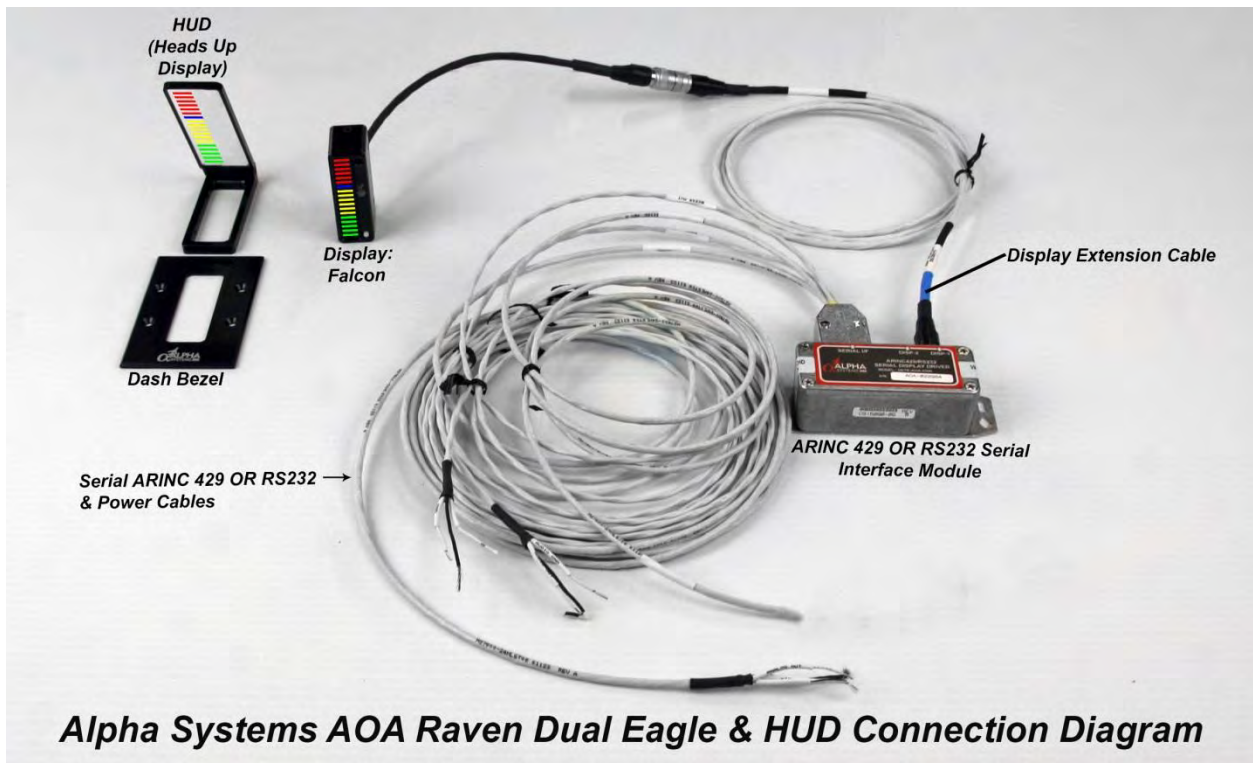
Current: .500 Amps @ full brightness all segments ON (Fused at 1 Amp. Breaker

Weight: A) Raven with single display, HUD, Brackets and all cables @ 2.00 Lbs.
B) Raven with dual displays, dual HUD's, brackets and all cables @ 2.75 Lbs.

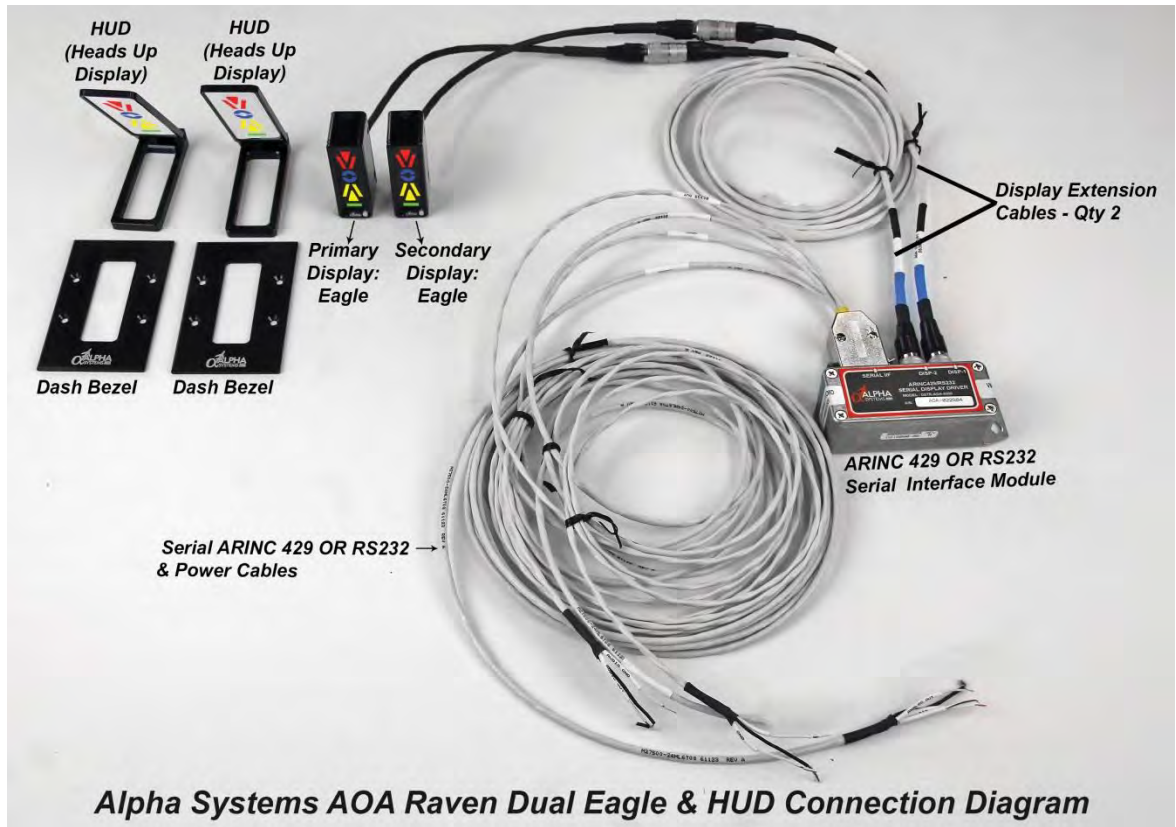
1.10 Raven: Single Chevron display



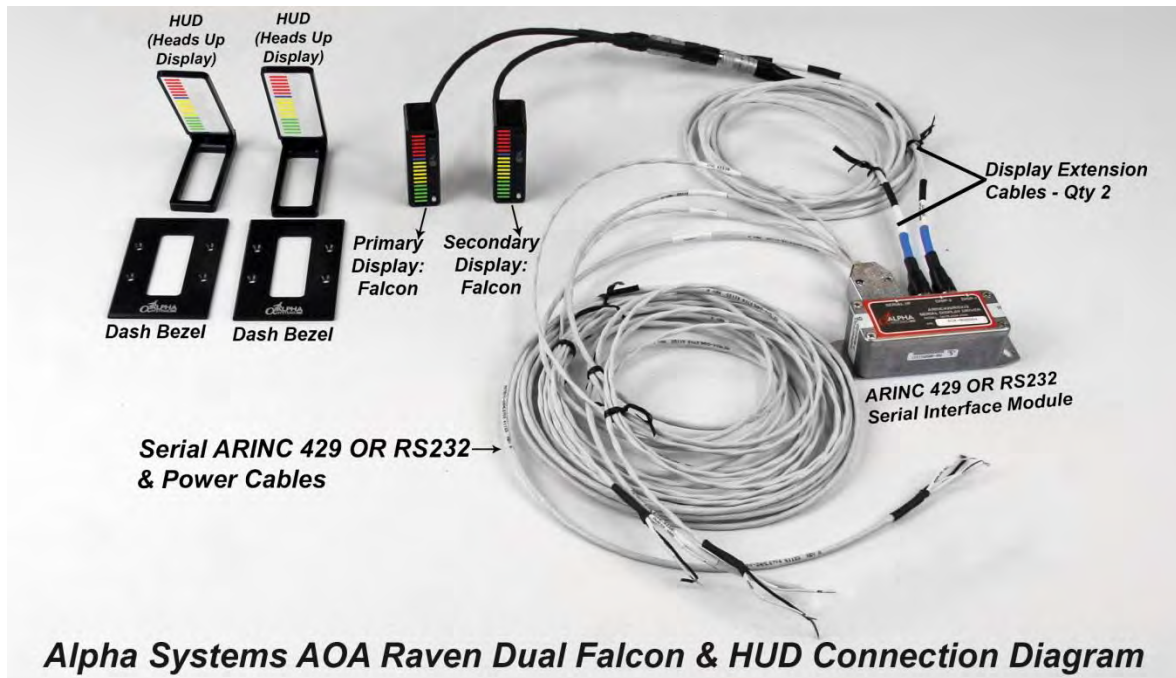
1.11 Raven: Single Bar graph display



1.12 Raven: Dual Eagle / Chevron display



1.13 Raven: Dual Falcon / Bar Graph



1.14 Display Overview:

MOUNTING IN OR ON THE GLARE SHIELD

The Raven AOA kit (**Chevron Styled segments**) **OR** the **Falcon kit (vertical bar graph)** are AOA displays that can be mounted under or on top of the glare shield. By attaching the HUD system reflects the image directly to the pilot with uniquely shaped colored segments. The display has the dimensions of 2.5" long X .860" wide X 1.250" deep. The entire kit weighs less than 3.0 LBS including the prewired electronic cables.

The display can be mounted anywhere on the cockpit but **is recommended to be mounted on top of the glare-shield DIRECTLY in front of each pilot.** The HUD system utilizes a custom "Beam Splitter" glass to reflect the image to the pilot but also seeing through it at the same time. It is imperative that the display be mounted so that the pilot can see the entire AOA display reflection when seated without moving or shifting the body or head. The intention of the HUD was to enhance the pilots' ability to quickly view the illuminated AOA indications, looking through the HUD while focusing outside the cockpit. The HUD can tilt up or down to adjust for pilot height or seat position and can be laid flat for storage. It comes with a protective sleeve to protect the glass when not in use.



1.15 HUD

IN GLARE SHIELD MOUNTING KIT

Description: The HUD Display adapter was designed to fit our standard vertical displays, such as the “Eagle” and “Falcon” line of (2.5” H X .865” W) displays. This “Heads Up Display” adapter with adjustable mounting brackets and base plate system allows the display to be mounted flush, below the glare shield pointing up. The HUD mounting frame slides over the face of the AOA case and has four plastic tipped set screws that tighten against the front lip of our display. Once installed, the lens is tilted so the AOA display is reflected and viewed in the pilot’s peripheral vision. This glass allows the pilot to see through the HUD while viewing the transitioning of colored segments corresponding to the aircrafts’ AOA.

NOTE: When the display is mounted in the glare-shield, display is positioned upside down so the reflected image has RED at the top of the glass!

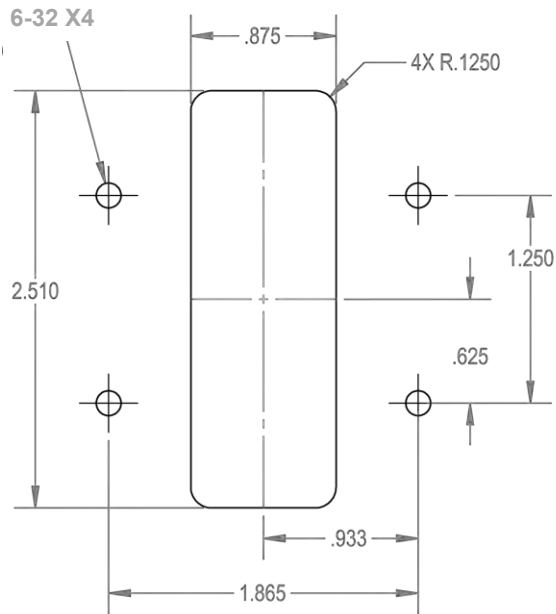


Most installations are completed as seen above. There must be 1.500” clearance under the glare-shield to allow for the AOA case and the electrical cable clearance. The adjustable mounting brackets allow for thicknesses of glare shield and desired heights of the display mounting.

1.16 Display Mounting with HUD

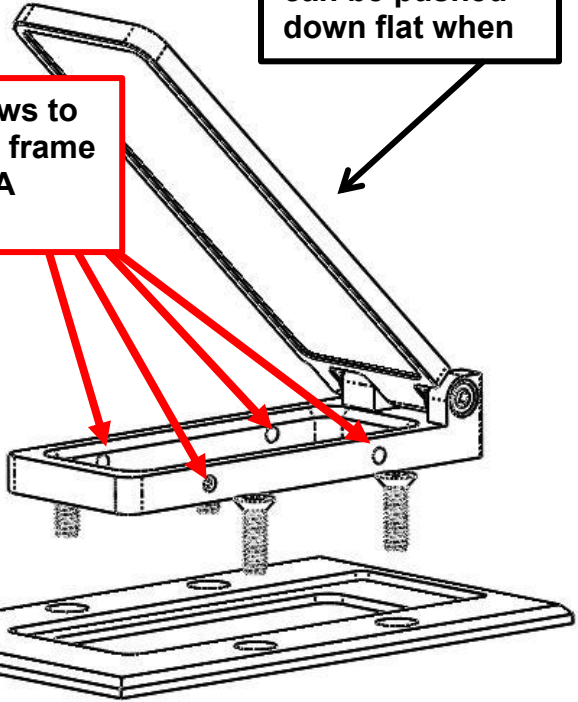
ALPHA SYSTEMS AOA

GENERAL



The HUD is lifted and adjusted for pilot viewing or can be pushed down flat when

4 set screws to attach the frame to the AOA display.



Glare-shield cutout drawing for flush mounting. This allows for the display to protrude up through the glare shield.

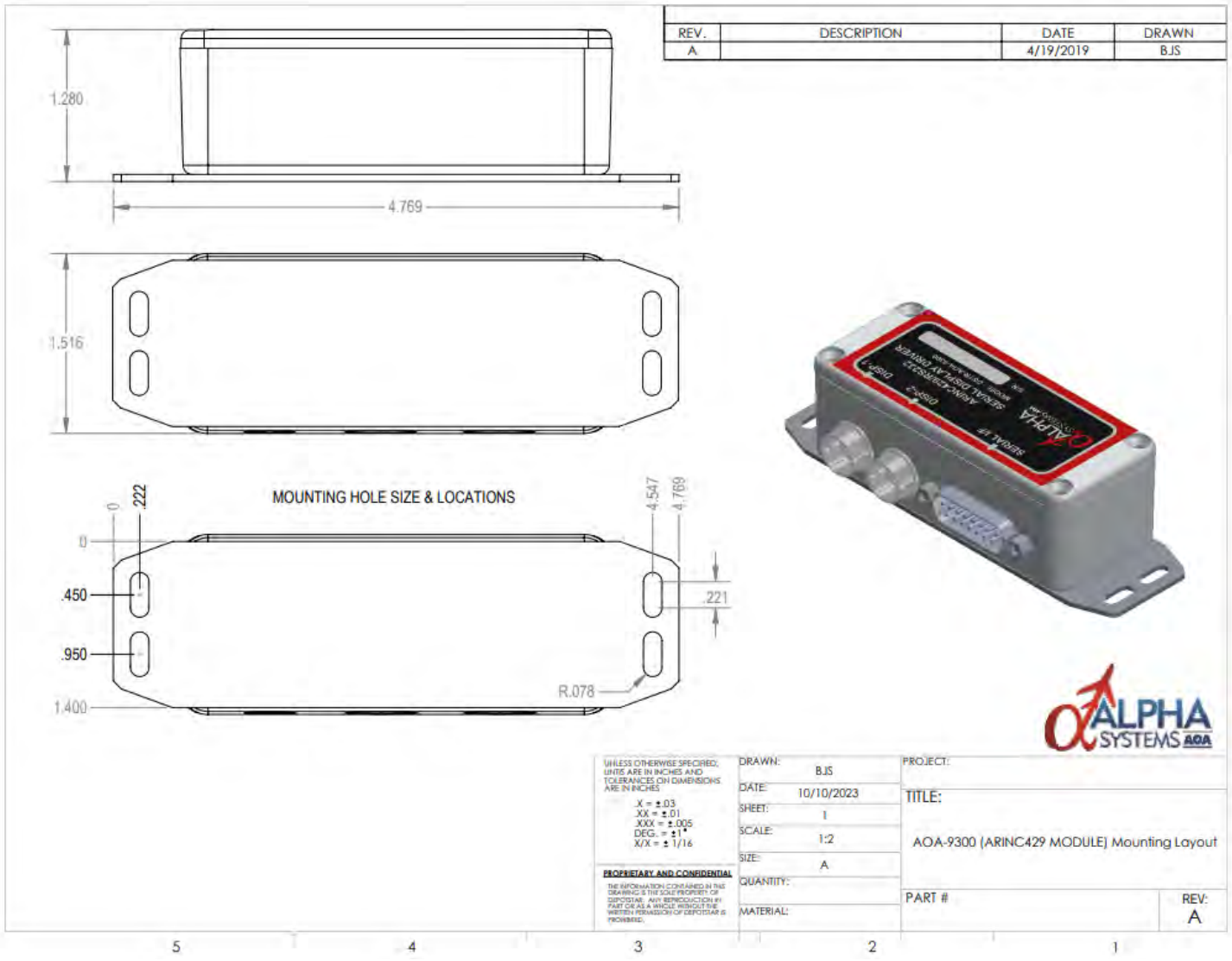
The HUD base plate rests on the top of the glare-shield screws to the brackets underneath.

Adjustable mounting bracket screws attach to the side of the AOA display.

NOT TO SCALE

1.17 Raven Control Module

The Raven control module must be mounted securely to the aircraft as not to interfere with other aircraft systems, within 6 feet of the displays. This module contains the power supply, display drivers and monitors the aircraft AOA data bus. The control module weighs .3 lbs



2. ELECTRICAL

2.1 Electrical Overview

The **Raven** kit comes prewired with a single or Dual Eagle (Chevron styled) displays, all wiring, mounting hardware, 6-foot display extension cables, DB15 Data and Power connection cables and preprogrammed to match the AOA range of the existing system. There are 3 connectors on the Interface Module, two round display connectors and a DB-15 pin Host interface connector. The kit also comes with two data line connection fuses. Due to the number of aircraft models and types, Alpha Systems recommends an aircraft specific disconnect AOA switch through a fuse of 1 Amp. Or a Klixon styled, pull out breaker / fuse at 1 Amp. connected to the avionics power buss.

Display Connectors on the Serial Display Driver Module

All cables come prewired and tested. There are two Display Connectors, Hirose 10 pin, used to connect the Displays to the Interface Module. Display 1 (DISP-1) is the **PRIMARY** Display position and Display 2 is the secondary Display position. DISP 1 is considered the primary display. Both displays are paralleled internal driving identical information on both displays.

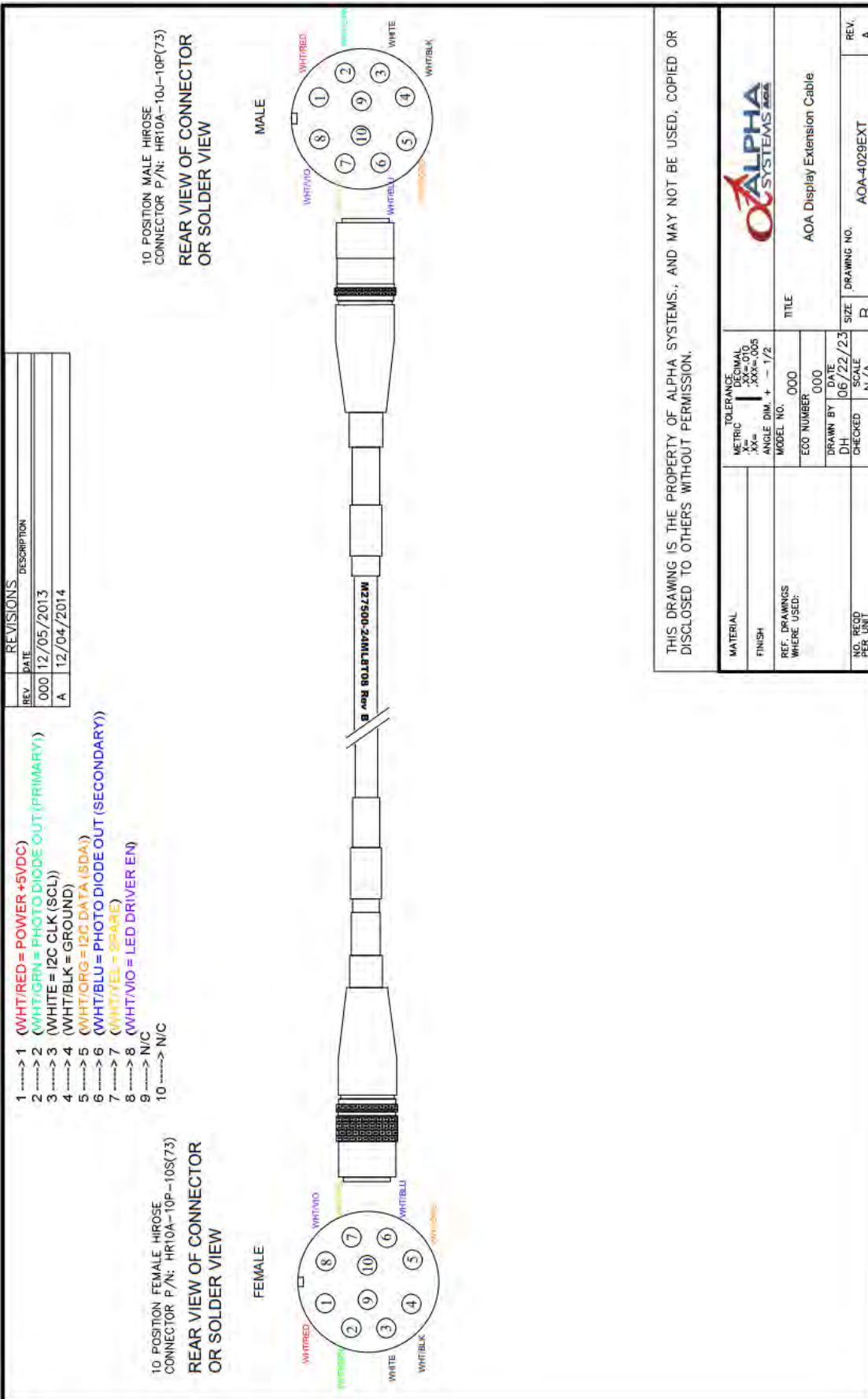
Power In and ARINC429 Host interface DB15 Connector

The Power In and ARINC429/RS232 Host Interface Connector is a 15 position DSUB connector used to connect the Adapter to the Host System and contains the following signals. The system comes with shielded cables with one end of the shield attached to the case of the ARINC 429 module. It is not necessary to connect the open shield wires unless the case is NOT grounded or in a non-metallic aircraft.

DB-15 Connector

- Pin 11; Power: +12 to +28 VDC, 1 Amp. min.
- Pin 10; System Ground
- Pin 3; ARINC429 RCV+ (to Aircraft ARINC429 Bus, TX+)
- Pin 4; ARINC429 RCV- (to Aircraft ARINC429 Bus, TX-)
- Pin 7; (Not Used)
- Pin 8; (Not Used)
- Pin 5; (Not Used)
- Pin 2; (Not Used)
- Pin 6; Signal Ground
- Pin 1; Shield

2.2 Raven Electrical Connections

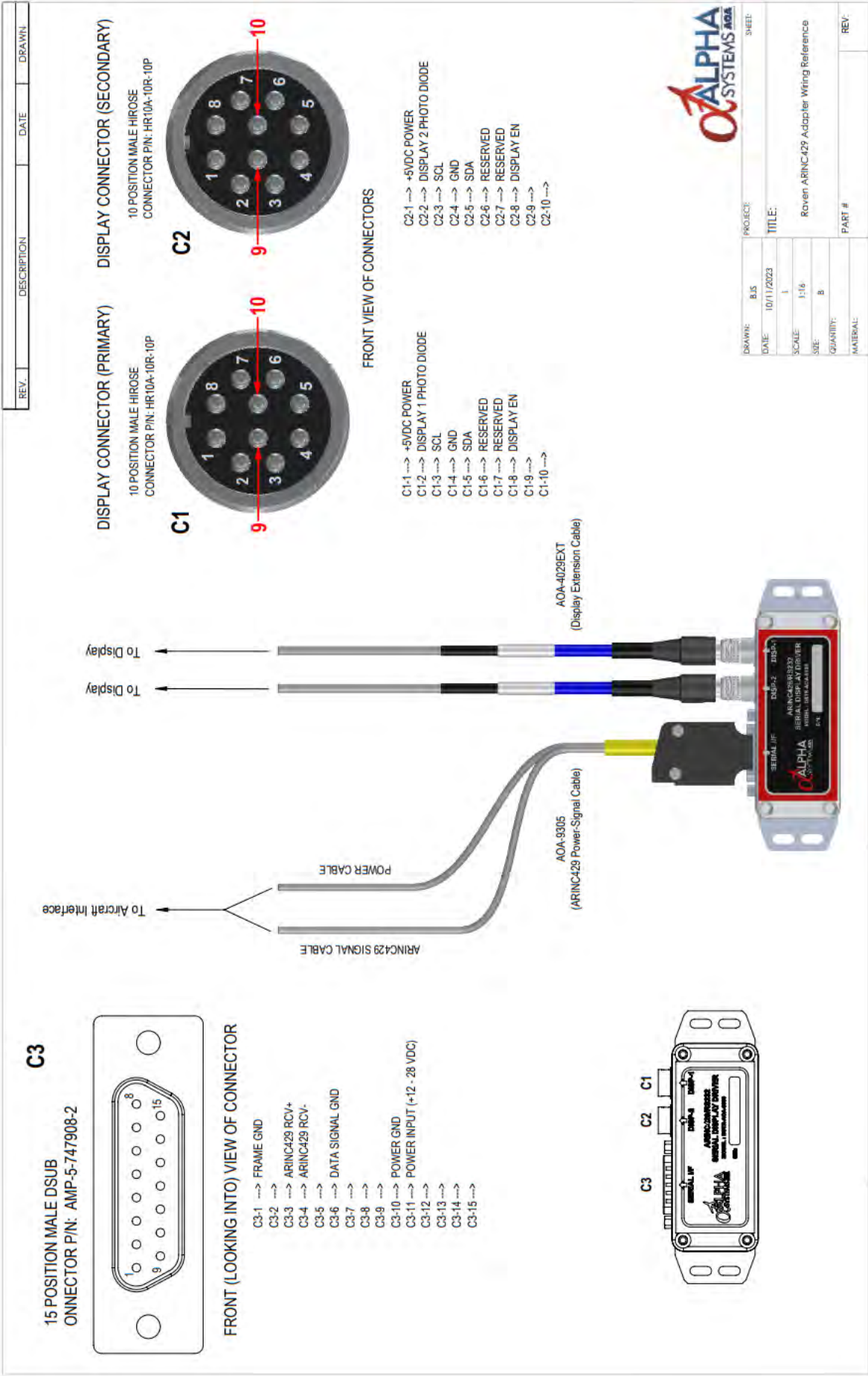


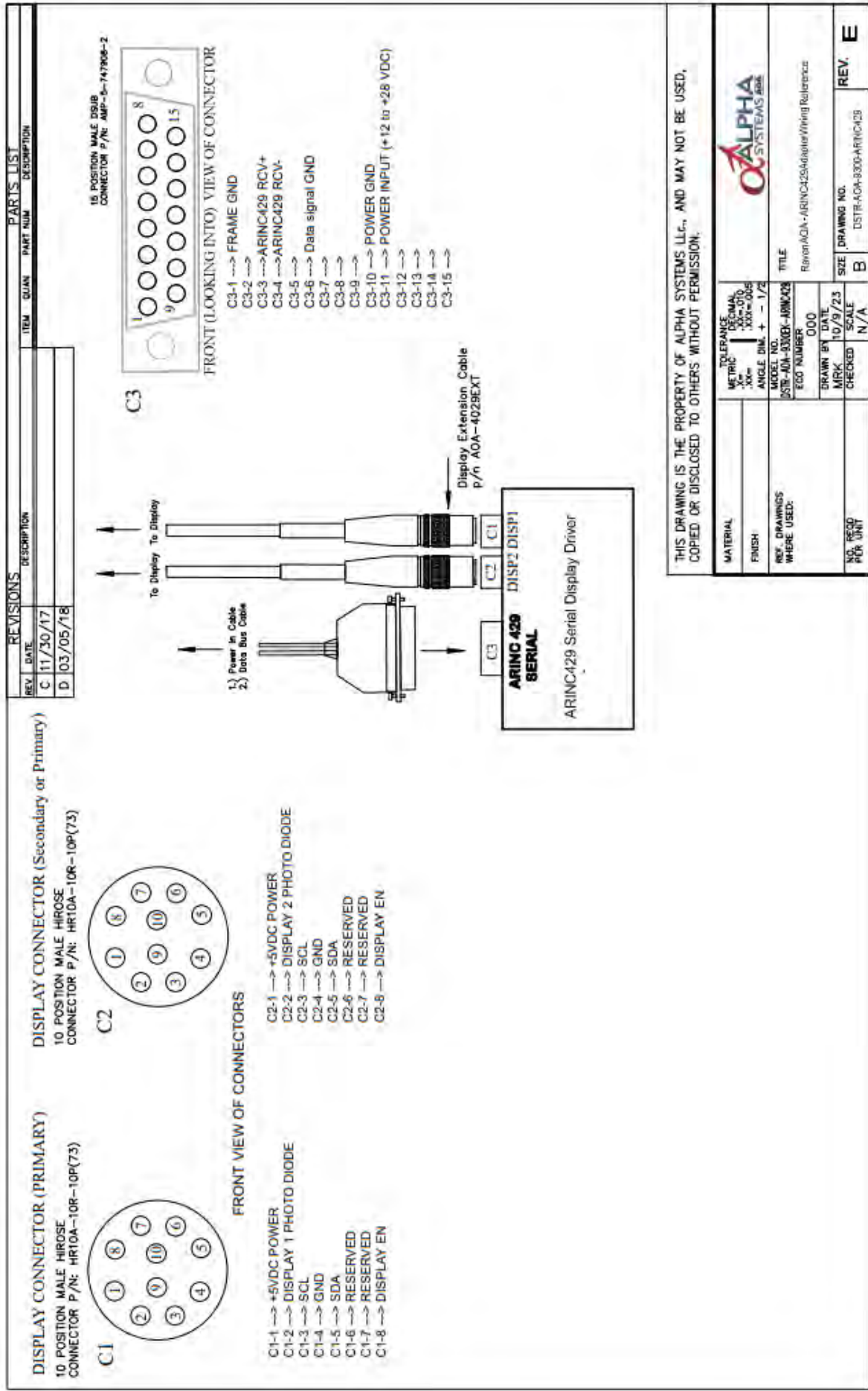
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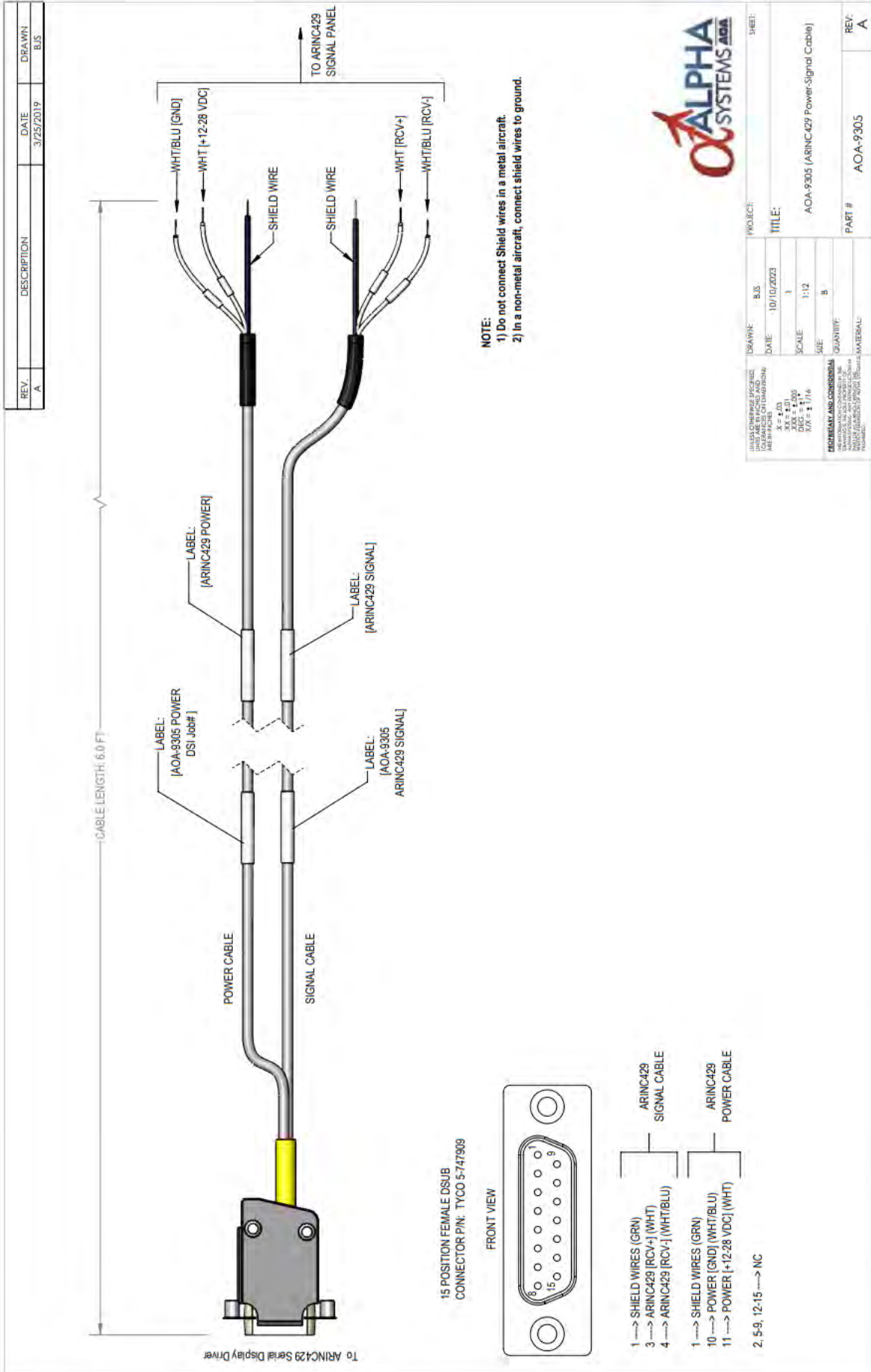
- 1 ----> 1 (WHT/RED = POWER +5VDC)
- 2 ----> 2 (WHT/GRN = PHOTO DIODE OUT (PRIMARY))
- 3 ----> 3 (WHITE = I2C CLK (SCL))
- 4 ----> 4 (WHT/BLK = GROUND)
- 5 ----> 5 (WHT/ORG = I2C DATA (SDA))
- 6 ----> 6 (WHT/BLU = PHOTO DIODE OUT (SECONDARY))
- 7 ----> 7 (WHT/YEL = SPARE)
- 8 ----> 8 (WHT/AVIO = LED DRIVER EIN)
- 9 ----> N/C
- 10 ----> N/C

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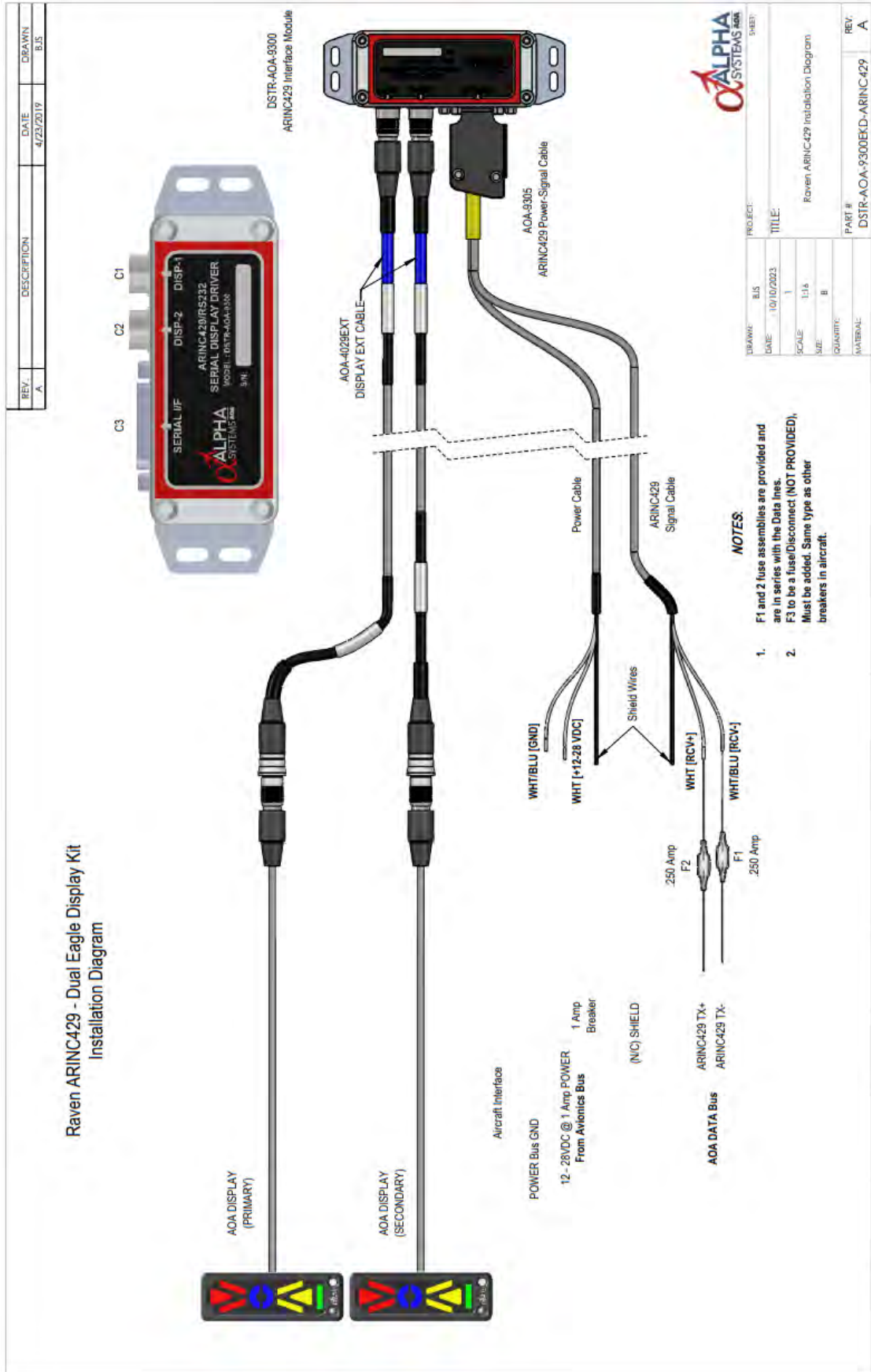
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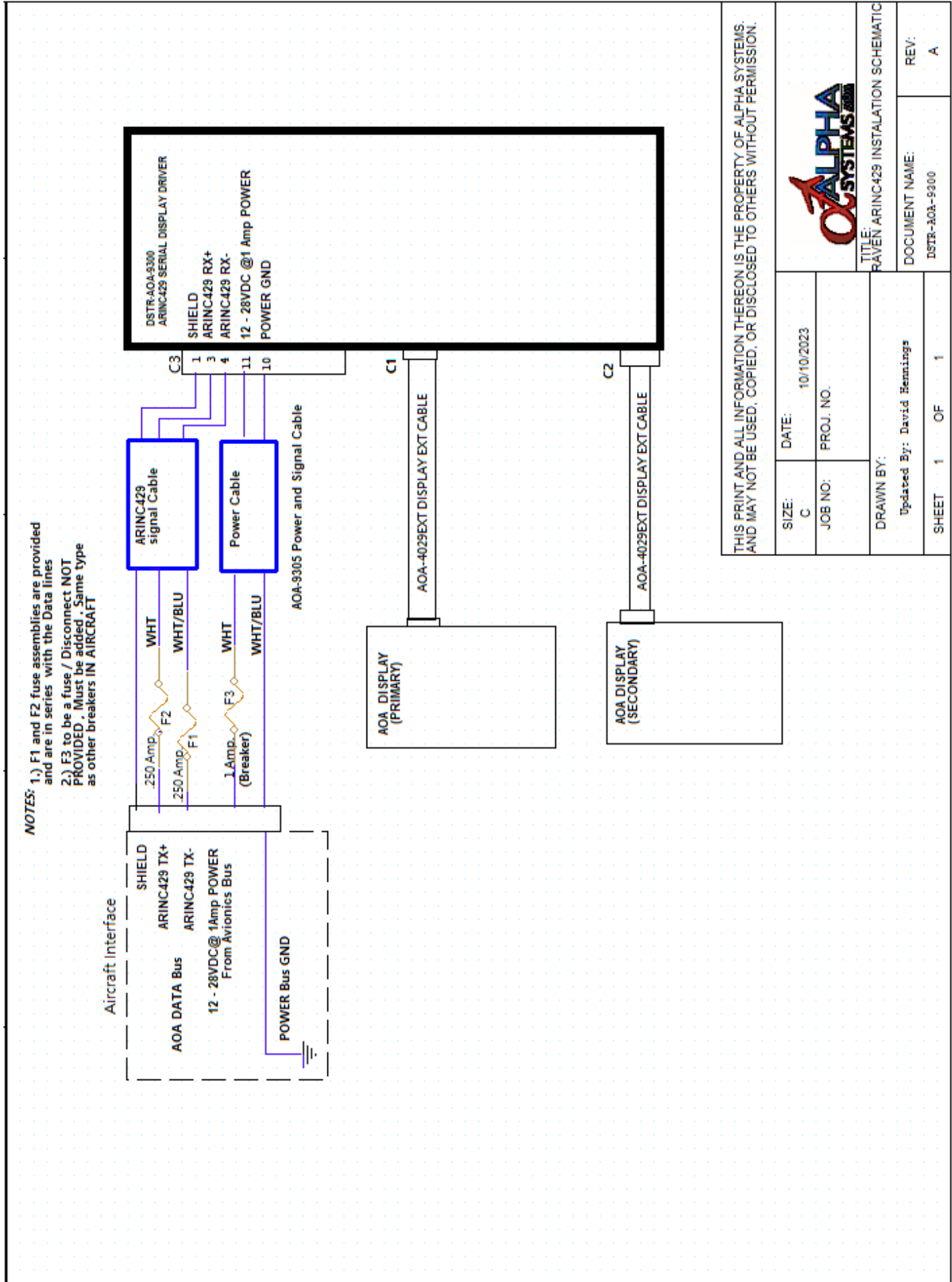






2.3 Raven to Aircraft Connection Diagram





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3. DISPLAYS

3.1 Display Control

Setting Calibrated Day / Night Brightness Levels

The maximum / minimum brightness levels for the Display/s can be set in your aircraft by doing the following procedure for presetting both the daytime and nighttime brightness levels while on the ground. The display incorporates a photosensor set to detect two different ambient levels. Once set, the display/s illumination will toggle automatically between the 2 preset levels of brightness based on the amount of light received by the photo diode.

To Enter the Display Brightness Level Routines

With power OFF, Hold the Brightness button down on the **PRIMARY** Display, power the AOA ON. Wait 5 seconds, release brightness button. The unit is in the brightness level set procedure indicated by the display going through the illumination sequence followed by ALL SEGMENTS staying on.

To Set the Daytime (Brightness) Level

With Power On: shine a bright light on the photocell

- Press the brightness button repeatedly on the Primary DISPLAY until it is at the acceptable high ambient light brightness level.
- With each button push the display will increase one step until the maximum brightness is reached.
- The unit will indicate it has reached the maximum brightness level when all LEDs flash on and off 3 times.
- If brightness button pushed again, the display will cause the brightness level to drop to the minimum level, each additional button push will increase the level of brightness stepping through 16 individual steps.
- When the desired brightness level has been reached, wait more than 5 seconds for the unit to store the calibrated BRIGHT setting before removing the light from the photocell.

Eagle AOA Display



Photocell

Brightness Button

Falcon AOA Display



Photocell

Brightness Button

3.2 To Set Night Time (Dim) Brightness Level:

With Power on: Cover the photocell on the Primary Display with your thumb or with a piece of solid black tape, wait 5 seconds. By pressing the brightness button repeatedly (on the primary the display), you will achieve an acceptable low ambient light brightness level. **Wait about 5 seconds for the unit to store the calibrated setting before uncovering the photocell.**

To Check Preset Levels:

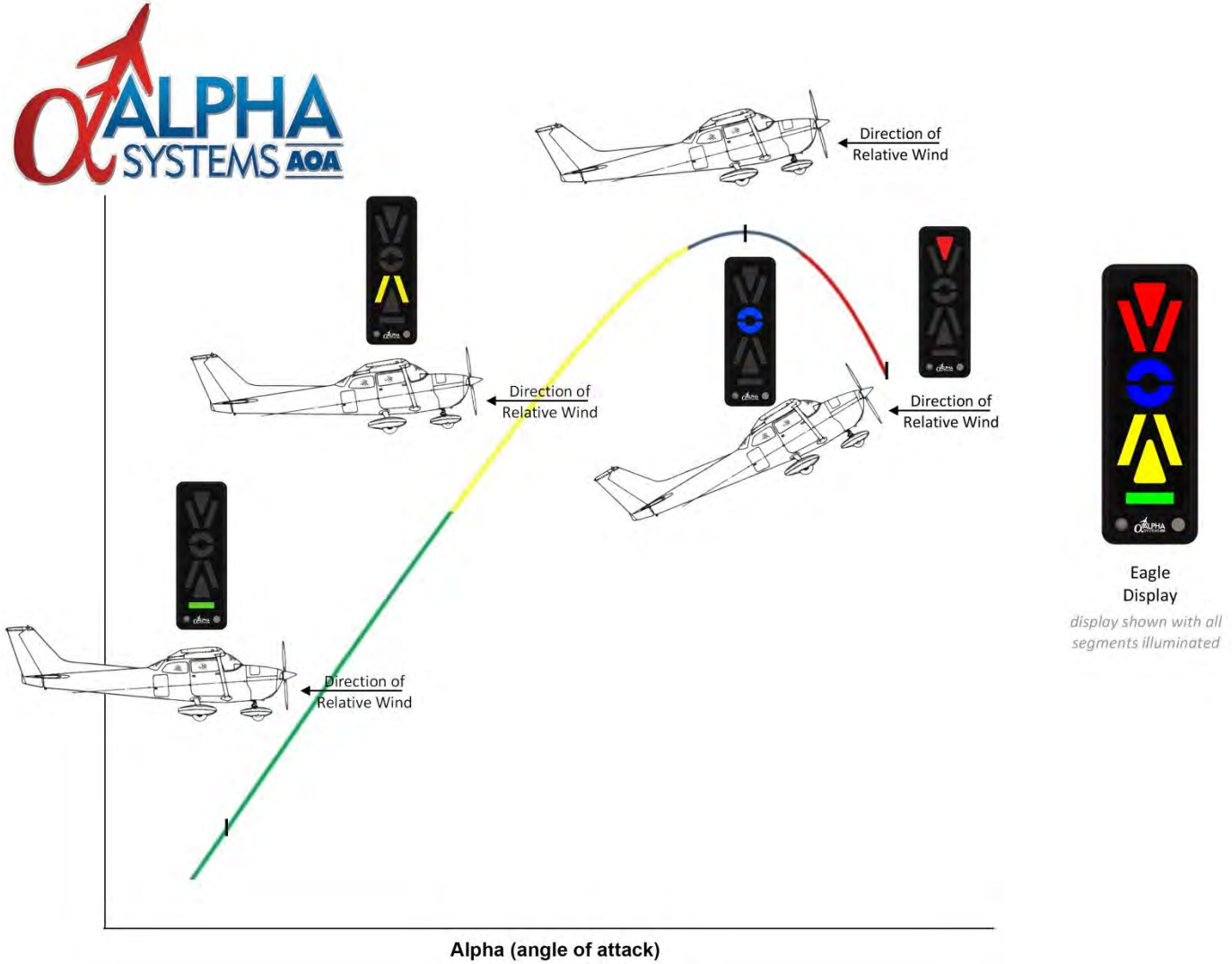
When still in the Brightness level set routine; Apply light directly to the photo diode on the primary AOA display and wait 5 seconds, both displays should change to the Daytime preset level. Cover the photocell with a solid piece of tape. Wait 5 seconds, both displays will switch to the Night Time (DIM) brightness level. Power the system OFF. Preset brightness levels set.

Adjusting the Display/s Brightness

The Brightness of the Display/s can be adjusted “on the fly” by pressing the Brightness button on the lower right side of the **PRIMARY** Display. The Secondary Display Brightness button is non-functional however the brightness will match the Primary display. There are sixteen levels of Brightness. When the Display reaches the maximum brightness level, all the LEDs on the Display/s will flash on and off 3 times. If the Brightness button is pushed again, the Display/s will be at the dimmest level of brightness. With every additional button push, the displays will step or increase the brightness of all segments.

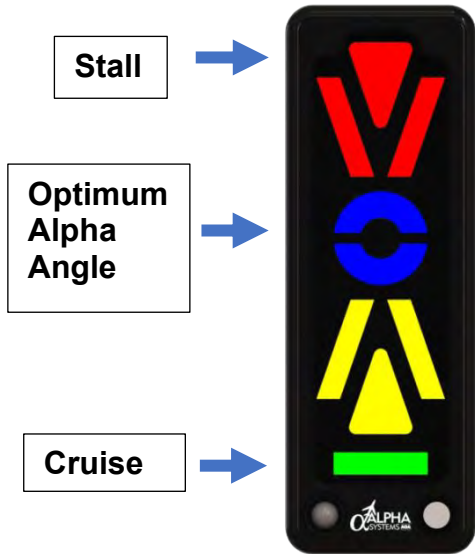
3.3 Display Indications of AOA

The Raven AOA single and dual displays are repeating the range of AOA from the aircraft system AOA. There is NO calibration required. Verification of the aircraft indicated AOA range and set points MUST repeat of the Raven display throughout the entire range.

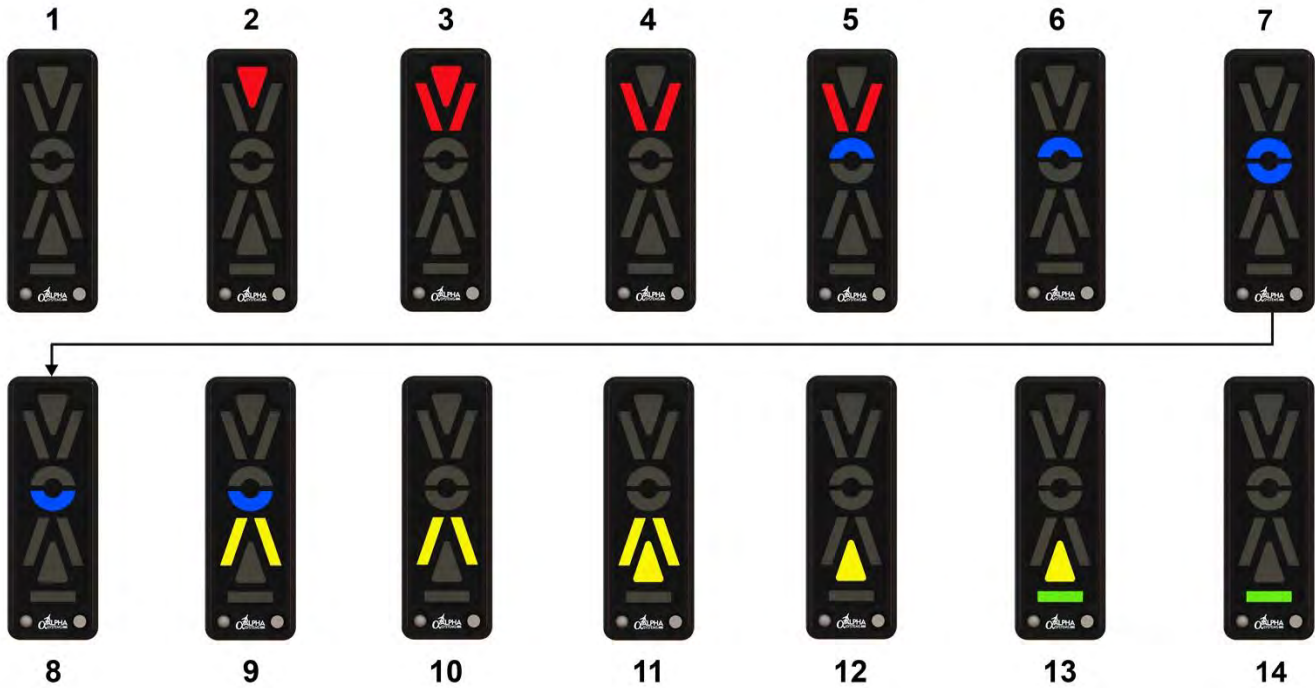


3.4 Segment Transitional Range

The Eagle display transitions through 14 combinations of individual segments creating a scale or range of AOA that shows the pilot, in his peripheral vision, instantaneously changes of AOA throughout all maneuvers. From takeoff climb to landing, turns, banks and descents.



Eagle Display



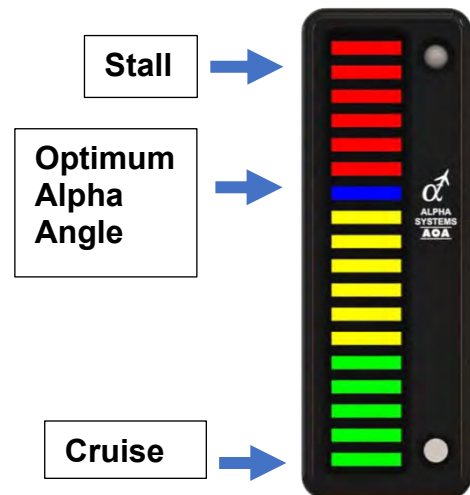
www.alphasystemsaoa.com

3.5 Selecting the Falcon Bar Graph Display Type

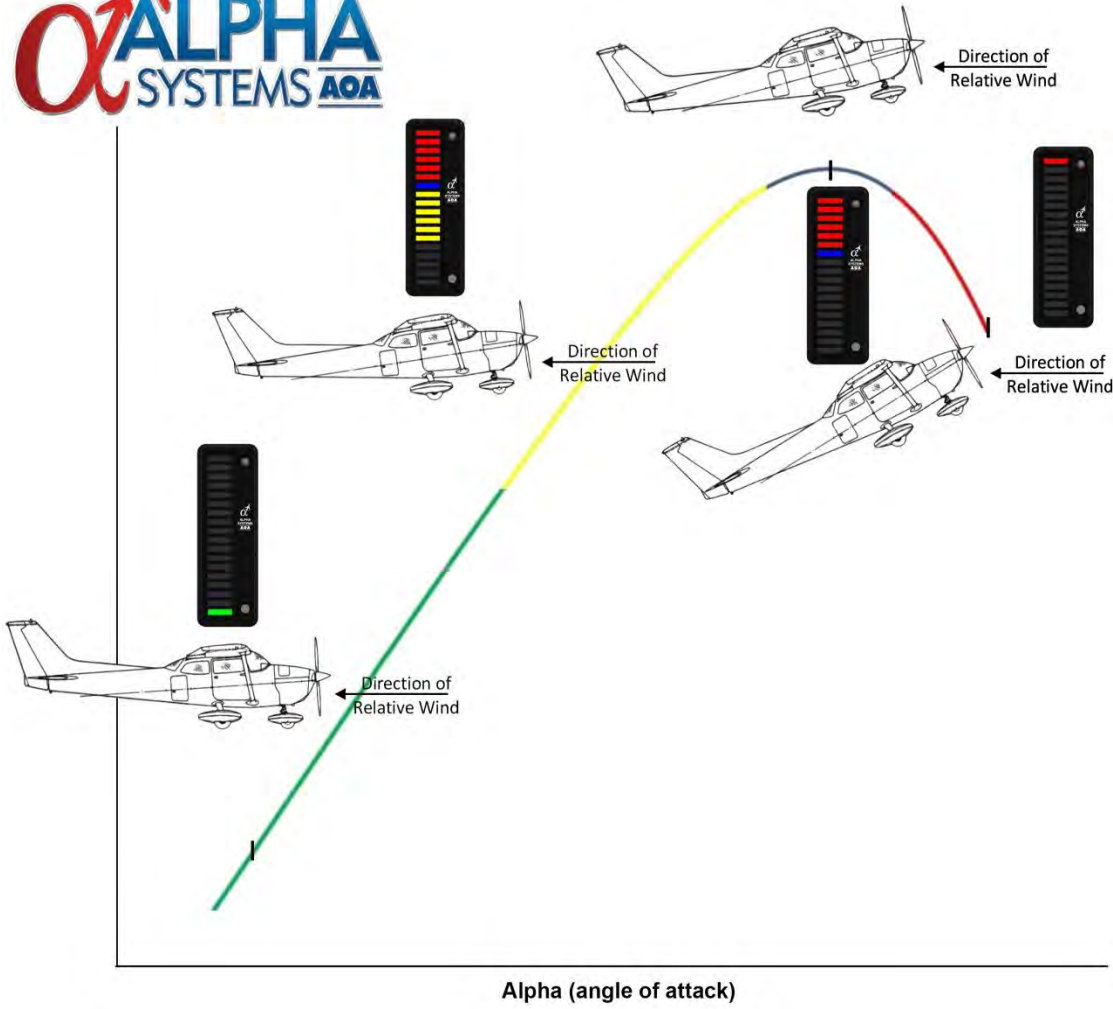
The Raven display is capable of four distinctive illumination routines of 18 individual transitions to tailor the way the display shows AOA for pilot preference. These are selectable during a set up procedure at power up. Once selected, the display routine will be defaulted at every future power on of the system. They include options 1 through 4 as seen below.

- To enter the display type selection routine, press and hold the primary display brightness button while powering the system on. Release the brightness button.
- The display option number 1 will illuminate and be selected first.
- Press and release the brightness button again. The second display option type will be illuminated and selected.
- Press and release the brightness button again. The third display option type will be illuminated and selected.
- Press and release the brightness button again. The fourth display option type will be illuminated and selected.
- To review or select another display illumination routine, by pressing the brightness button again, the display will replay option number one. With every brightness button push, the unit will show the next display option.
- When you are satisfied with the selected display type, power off the system and the last display selection will be stored to memory.

The Falcon display transitions through 18 individual segments creating a scale or range of AOA that shows the pilot, in his peripheral vision, instantaneously changes of AOA throughout all maneuvers. From takeoff climb to landing, turns, banks and descents.



3.6 Typical display segments of the Bar graph display



Falcon Display

display shown with all segments illuminated

3.7 Raven Typical Bar Graph Transitions

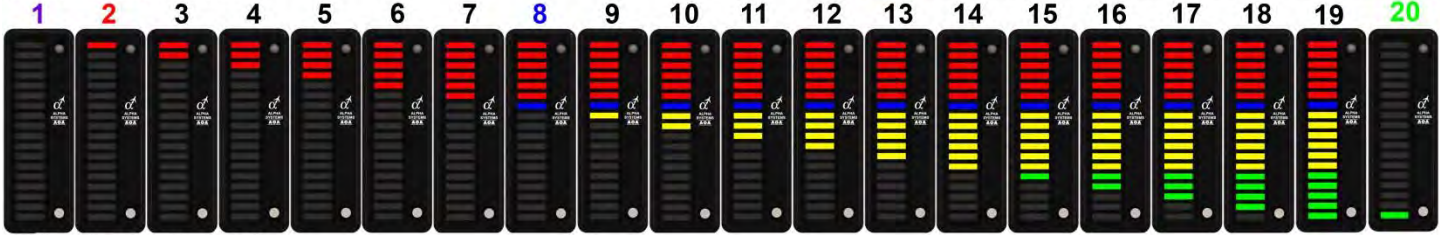


Falcon Display

Calibration Set Points:

1 - Ground	(Zero Set Point)
2 - Indication of Impending STALL	(CAA)
8 - Optimum Alpha Angle (OAA)	(1.3 x Vs)
20/19 - Cruise Alpha	(Va or Maneuvering Speed)

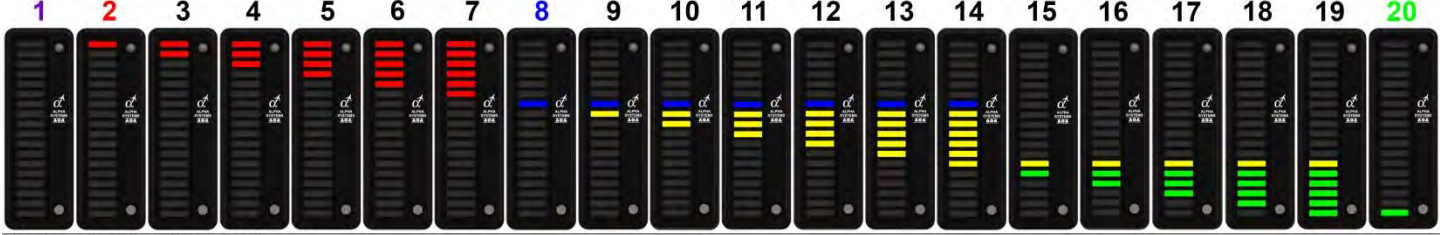
Note: Display Option 1



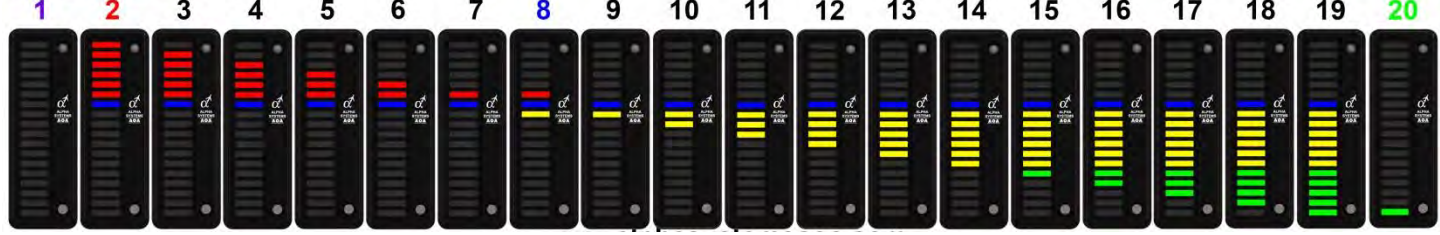
Note: Display Option 2



Note: Display Option 3



Note: Display Option 4



4. OPERATIONS

4.1 Operations

When power is applied the unit will illuminate one segment after another until all segments are illuminated. Flash, then turn off one segment after another until all are turned off.

The unit is monitoring the AOA data bus from the aircraft. The Alpha Systems AOA display will illuminate the segment corresponding to the AOA information provided. It will transition from one end of the scale to the other as outlined in chapter three.

4.2 Verification

When first installed, it is important that verification of the set points on the aircraft AOA and the Alpha Systems AOA are lined up. Verification of the entire range from one end of the scale to the other, the Alpha Systems AOA matches the transitions and the rate of change must equal the aircraft's AOA.

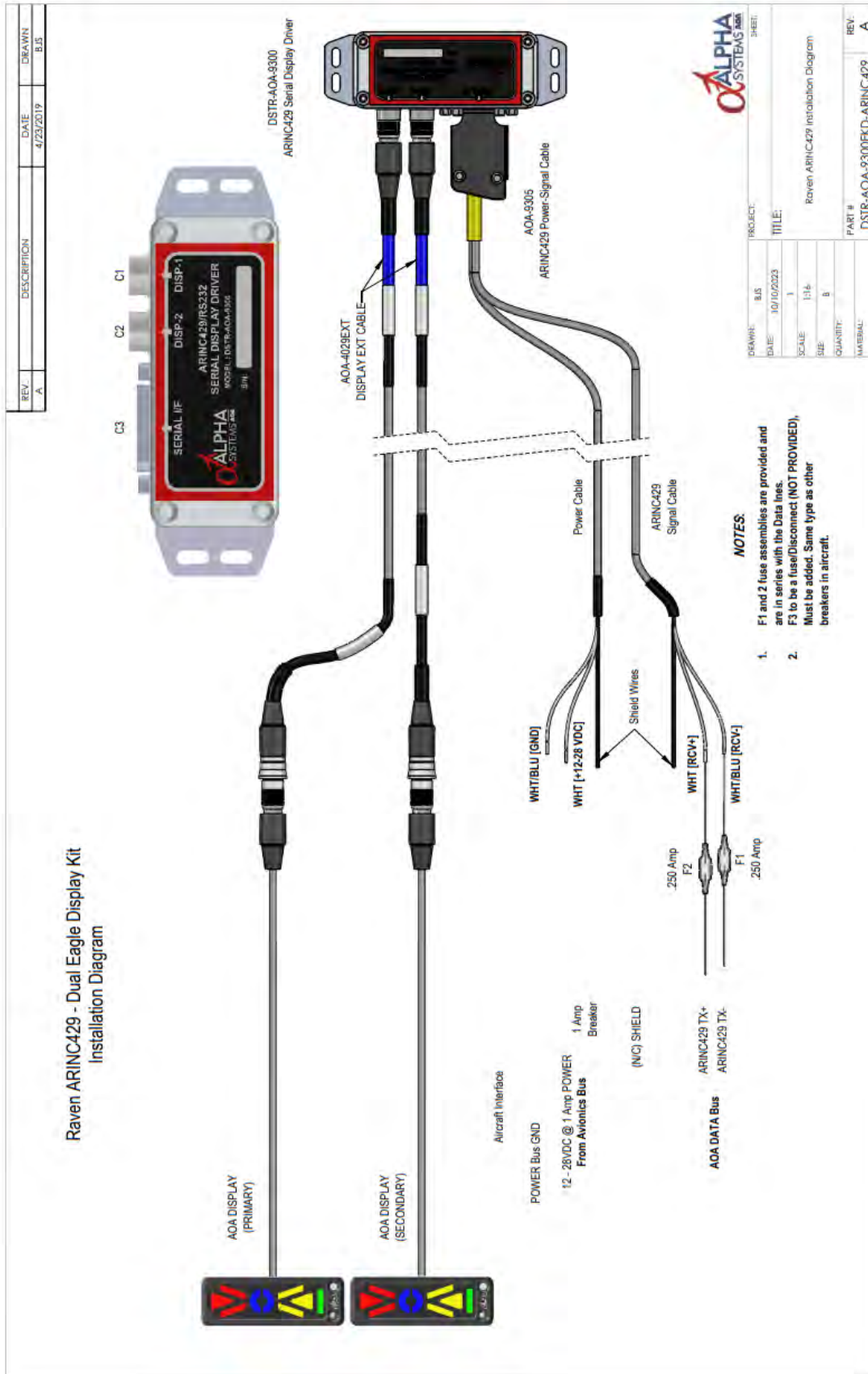
4.3 Testing

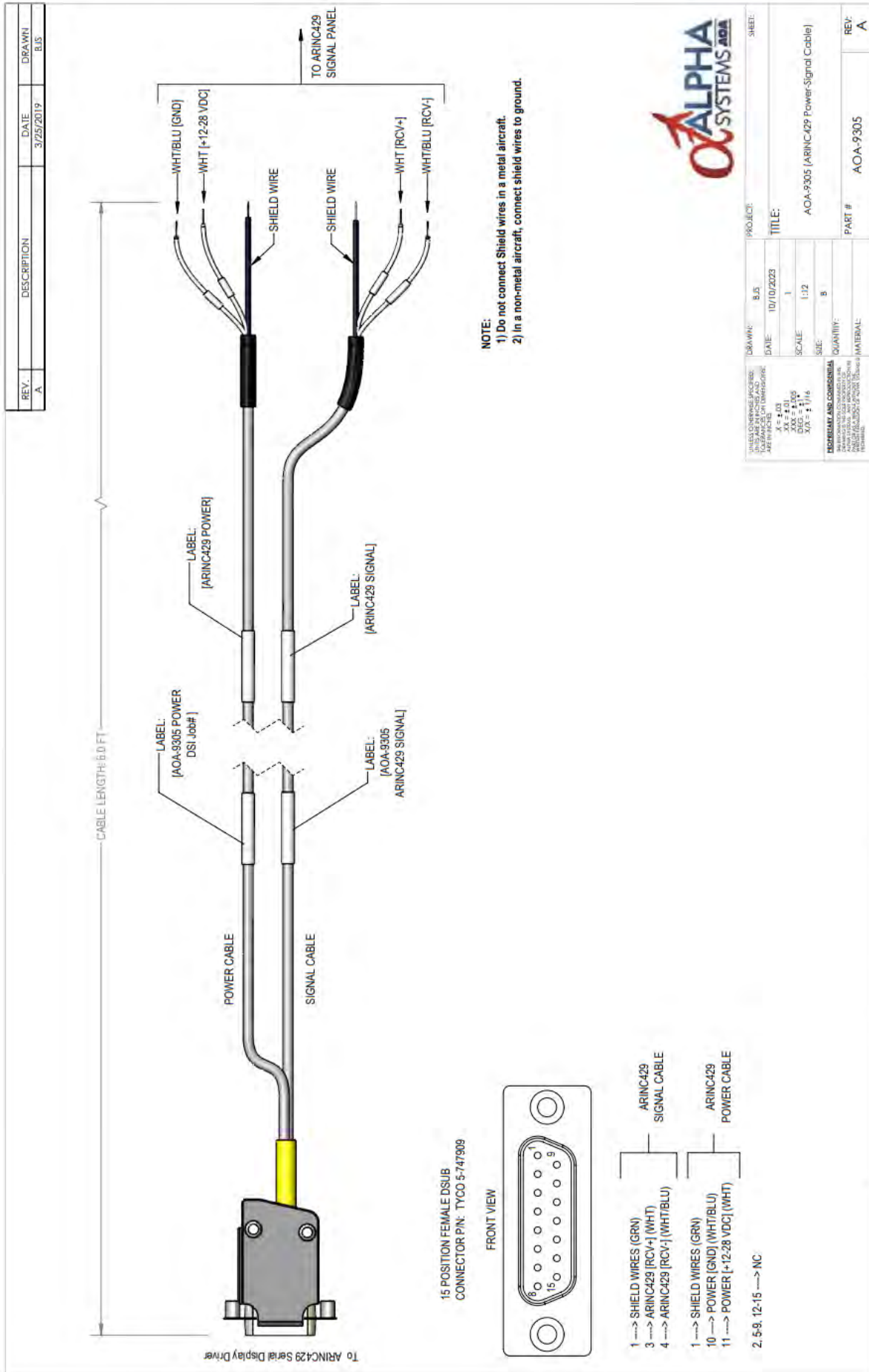
When on aircraft power or ground power, turn the avionics bus ON. Turn ON the aircraft's AOA. Verify AOA is on the aircraft PFD, Gauge or system. Turn power ON the Alpha Systems AOA. Verify the Alpha Systems AOA initiates the display illumination self-test routine with each segment turning ON, when ALL are ON, then each segment turns OFF one segment at a time.

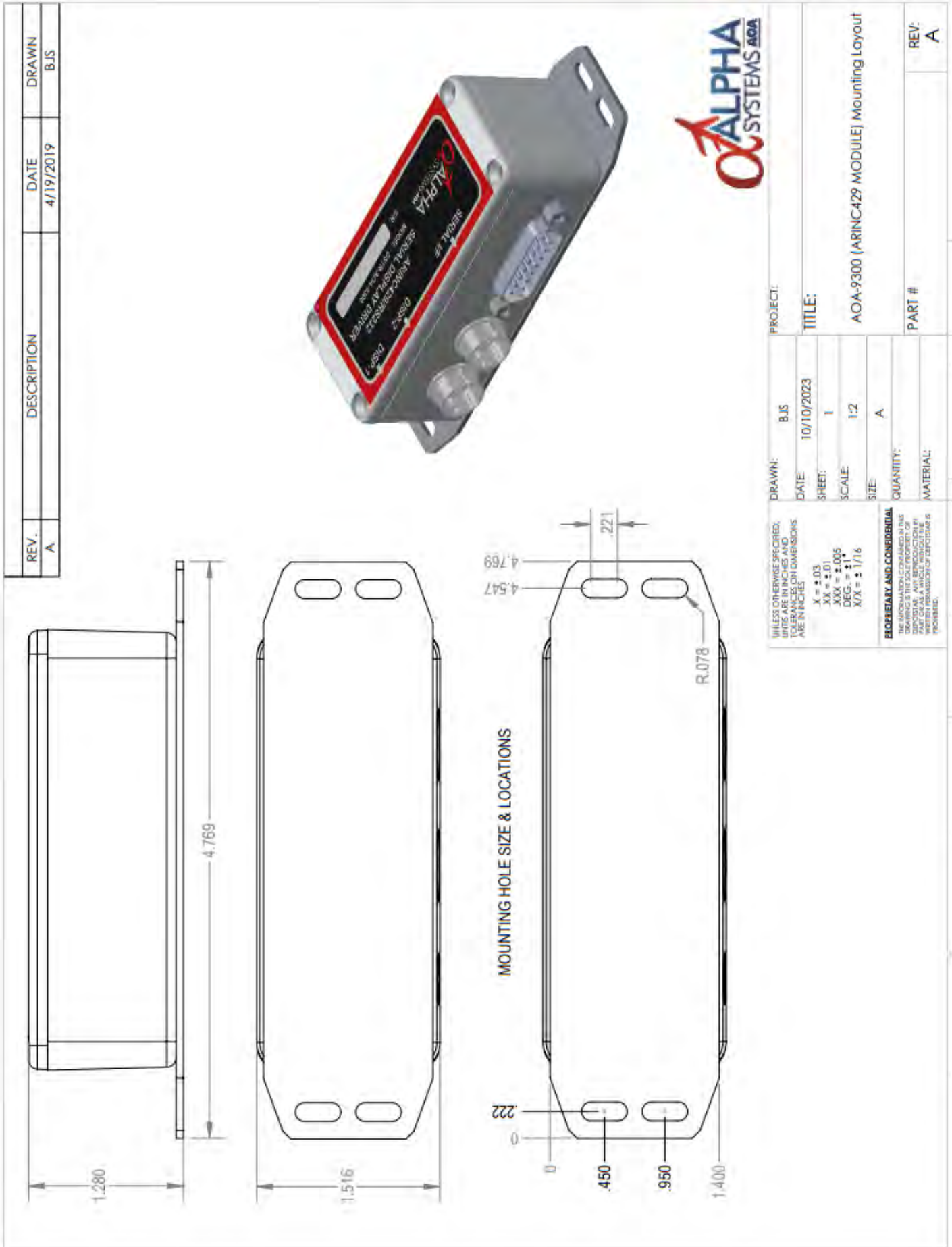
Once the self-check is complete, verify the aircraft's indicated AOA position. The Alpha Systems AOA display must match the starting indications. Slowly move the AOA Vane, Cone or Stagnation point sensor (lift transducer) while monitoring the Aircraft's AOA position changes. The Alpha Systems AOA display must mirror the same positions, speed of changes and, range of AOA indication throughout the entire AOA envelope. There is NO calibration required. If system does not function as described above, return for repair.

5. APPENDIX

5.1 Diagrams

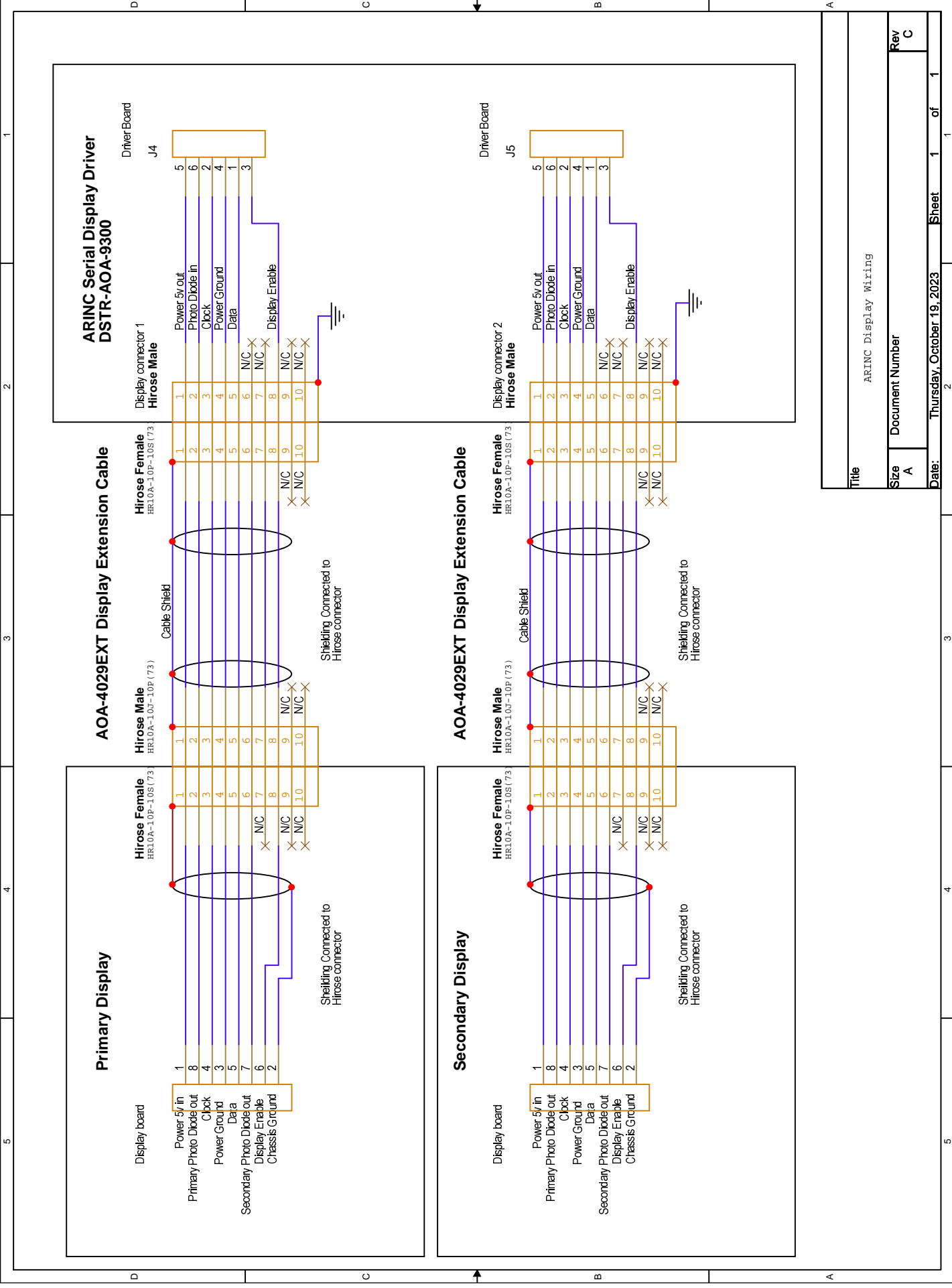






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XXX = ±.005	DEG. = ±1°	SHEET:	1	AOA-9300 (ARINC429 MODULE) Mounting Layout	
X/X = ± 1/16		SCALE:	1:2	QUANTITY:	A
PROPRIETARY AND CONFIDENTIAL THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF ALPHA SYSTEMS AOA. IT IS TO BE USED FOR THE PART ONLY AS A WHOLE WITHOUT THE PERMISSION OF THE ORIGINAL DESIGNER.		SIZE:	A	MATERIAL:	
		PART #		REV:	A



Title		ARINC Display Wiring	
Size	A	Document Number	
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Supplement: Raven kit:

Driving the Alpha Systems AOA Eagle Display via the ARINC429 Serial Adapter Driver

**The Adapter will drive up to two Eagle Displays via the ARINC429 Bus.
At least one Display must be a Primary Display.**

▪ ARINC429 Adapter Connectors

Display Connector

The Display Connector is a Hirose 10 pin connector used to connect the Display to the Adapter. Display 1 (DISP-1) is the **PRIMARY** Display position and Display 2 is the secondary Display position.

Power and ARINC429 Host Interface DB15 Connector

The Power and ARINC429 Host Interface Connector is a 15 position DSUB connector used to connect the Adapter to the Host System and contains the following signals.

- Pin 11; Power: +12 to +28 VDC, 500 mA min.
- Pin 10; Power Ground
- Pin 3; ARINC429 RCV+ (to Adapter from ARINC429 Bus)
- Pin 4; ARINC429 RCV- (to Adapter from ARINC429 Bus)
- Pin 7; ARINC429 TXD+ (Adapter to ARINC429 Bus) **(Not Used)**
- Pin 8; ARINC429 TXD- (Adapter to ARINC429 Bus) **(Not Used)**
- Pin 5; **(Not in Use)**
- Pin 2; **(Not in Use)**
- Pin 6; Signal Ground
- Pin 1; Shield

Adjusting the Display Brightness

The Brightness of the Display/s can be adjusted on the Fly by repeatedly depressing the Brightness button (WHT) on the lower right side of the **PRIMARY** Display, or if mounted in a HUD, in the “Hinged side” front left. The Secondary Display Brightness button is non-functional.

There are sixteen levels or step of Brightness.

When the Display reaches the maximum brightness level, all the LEDs on the Display/s will flash on and off 3 times.

If the Brightness button is then pushed again, the Display/s will return to the dimmest level of brightness, each additional push increases the brightness level one step, 16 steps.



Supplement: Raven kit:

Driving the Alpha Systems AOA Eagle Display via the ARINC429 Serial Adapter Driver

Setting Preset Day and Nighttime Display Brightness Levels

The maximum/minimum brightness levels for the Display/s can be set in your aircraft by doing the following procedure to preset both the daytime and nighttime display brightness levels while on the ground. Once set, the Display/s Illumination will toggle automatically between the 2 levels of brightness based on the amount of light received by the photo diode.

1. With power **OFF**, Hold the Brightness button down on the **PRIMARY** Display. Turn power **ON** while continuing to hold the Brightness Button for five seconds, release button.
2. After running through the Power **ON** internal Diagnostics, all the LED segments will be illuminated.
3. Cover the photocell on the Primary Display with a piece of black electrical tape, then wait 5 seconds.

With the photocell covered: (Simulating nighttime light levels)

4. Press the Brightness Button repeatedly on the **Primary DISPLAY** until the desired brightness level is reached at the simulated low ambient light.
5. Wait about 5 seconds for the unit to store the calibrated setting before removing the black electrical tape from the photocell.
6. Now, apply a light source directly to the photo diode on the Primary DISPLAY and wait 5 seconds.

With light on the photocell: (Simulating daytime light levels)

- 7.) Press the Brightness Button repeatedly on the Primary DISPLAY until the desired brightness level is reached at the simulated high ambient light. Wait 5 seconds for the AOA to store the "Daytime" or high ambient light level

The maximum brightness level is identified with the indication of all LEDs Flashing On and OFF 3 times, one more button depress will cause the brightness of the LED segments to return to the minimum brightness preset level.

- 8.) Wait 5 seconds for the unit to store the selected setting before removing the light from the photocell.
- 9.) Power the system OFF.



Supplement: Raven kit:

Driving the Alpha Systems AOA Eagle Display via the ARINC429 Serial Adapter Driver

▪ **Adapter ARINC429 Label**

The Adapter Driver Label has been preset to 5E hex (136 Octal).

▪ **ARINC429 Bus Speed**

The Adapter Driver has been set to run at High Speed.

▪ **ARINC429 Word Format**

The 32-bit ARINC429 word format for the Adapter is shown below where,

Bit 32 is a Parity Bit. It is not used or ignored by the Adapter.

Bits 31 thru 30 are not used by the Adapter.

Bit 29 is used as the Sign Bit and is set to a One for Valid AOA Data.

Bits 28 thru 17 define the AOA, ARINC429 Hex Data to the Adapter.

Bits 16 thru 9 are not used by the Adapter

Bits 8 thru 1 Define the Adapter Label. It is set to 5E hex.

32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
P	NU	S	AOA ARINC429 DATA										NOT USED						LABEL												



Supplement: Raven kit:

Driving the Alpha Systems AOA Eagle Display via the ARINC429 Serial Adapter Driver

Eagle Display:

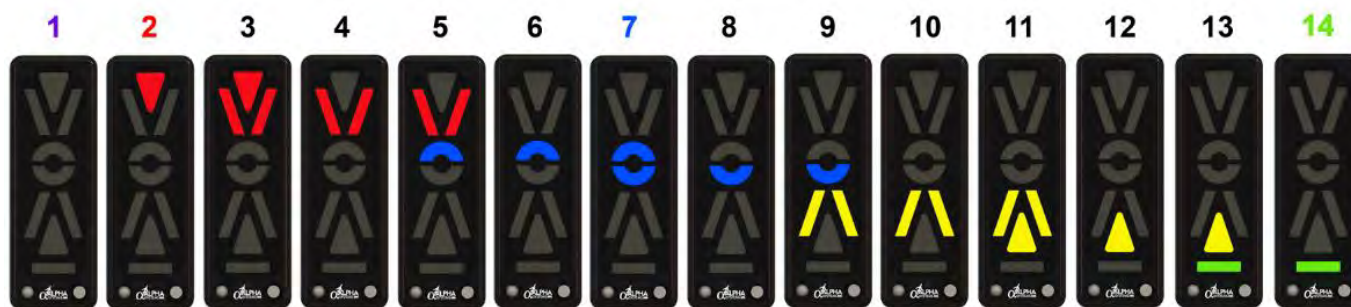
The following ARINC429 Data is sent to the Eagle Display/s in the data field to illuminate the desired segment or combination of segments.

ARINC429 Hex Data

(Bits 29 (SIGN), 28 thru 17 (DATA))

LED Illumination State

0x0000 to 0x17AF	All Off
0x17B0 to 0x188A	Red Triangle
0x188B to 0x191D	Red Triangle + Red Chevron
0x191E to 0x19AF	Red Chevron
0x19B0 to 0x1A42	Red Chevron + Upper Doughnut
0x1A43 to 0x1AD4	Upper Doughnut
0x1AD5 to 0x1B6A	Full Doughnut
0x1B6B to 0x1C04	Lower Doughnut
0x1C05 to 0x1C9E	Lower Doughnut + Yellow Chevron
0x1C9F to 0x1D38	Yellow Chevron
0x1D39 to 0x1DD2	Yellow Chevron + Yellow Triangle
0x1DD3 to 0x1E6C	Yellow Triangle
0x1E6D to 0x1F52	Yellow Triangle + Green Bar
0x1F53 to 0x1FFF	Green Bar



Typical Transitional AOA scale