

# The AFC: A Low-Cost Approach to Compatibility between Legacy and Modern Aviation LRU



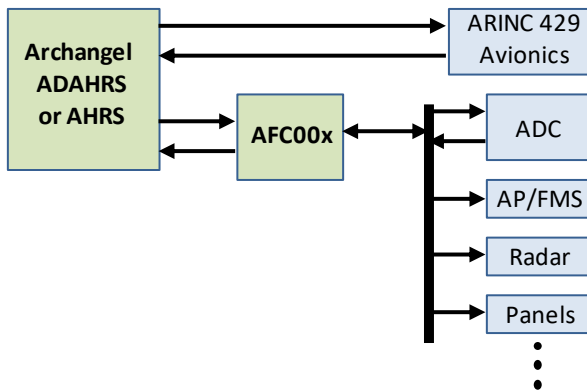
The goal of any aircraft upgrade project is to win the bid with margin to spare. Archangel's AFC product line gives you the best opportunity to do exactly that.

Combining Archangel's existing catalog of digital AHRS and ADAHRS with our AFC products creates a compelling replacement option for obsolete AHRS, ADAHRS, and DG/VG sets.

Per the diagram below, an Archangel AHRS or ADAHRS manages all ARINC 429 data while the AFC replicates analog traffic and handshake discretes.

With our strategy you retain as much of the legacy avionics as you like. Archangel designs and delivers an AFC specific to your architecture.

That is huge. The traditional bid-wait-worry process is turned on its head. You offer a menu of options across a cost spectrum, the client chooses, then Archangel creates your AFC.



The AFC001 shown below was the first AFC issued. It was specifically designed to interface Archangel's AHR150A ADAHRS to the Erickson S64 Skycrane autopilot.

The AFC001 outputs are dc voltages (synchro and 2-wire AC are also in play) proportional to roll, pitch, airspeed and altitude deviations. Erickson got a low-cost solution that supports two scenarios: 1) modern digital displays with a legacy autopilot now, and 2) a digital autopilot via a cable harness modification in the future.



## KEY FEATURES

- ARINC 429 input port
- Analog voltage output options:
  - DC / 2-wire AC / 3-wire synchro
- Mil Spec 38999 filtered connector

When combined with AHR150A ADAHRS or AHR75 AHRS, creates a compact, low-cost system solution

Configured to your analog data needs

## CERTIFICATIONS

- FAA TSO C9c
- DO-178C Level B software
- DO-160E environmental certifications including EMI, EMC, and HIRF

# AFC00X Q&A

## **Digital to analog data translators are on the market already. What's different about the AFC00X?**

First, other translators have a limited number of analog outputs. Three is a common scenario. Second, they convert ARINC 429 to only one analog format: either dc, ac, or synchro. Third, mix and match is not possible within the supplier's catalog. Fourth, their converters are not TSO approved. Fifth, handshake discretes critical to proper functioning are not available. Archangel's strategy with the AFC00X addresses all of these factors allowing as many as 10 output channels with independent gains.

## **Autopilots are the last bastion of analog input equipment. How can the AFC00X help me there?**

Legacy autopilots are indeed a bastion, and a wide variety of capability and complexity exists. Replacing a legacy analog autopilot usually means extensive flight testing under FAA supervision to ensure safe operation across the flight envelope. That level of money and time investments impacts the bid cost. Instead, keep the legacy autopilot and let the AFC00X send analog data to it while the AHR150A ADAHRS or AHR75 AHRS manages digital ARINC 429 comms with the rest of the architecture.

## **Give me an AFC00X configuration scenario.**

There is an obsolescence issue facing an established AHRS manufacturer. Data outputs on that product include ARINC 429 (3 channels); 3-wire synchro for roll, pitch and heading; 2-wire AC for roll and pitch at two different scale factors, analog dc for roll and pitch; and dc for yaw rate.

In the AFC00X scenario, Archangel's AHR75 provides that data in ARINC 429 format via its three output ports. One AFC00X can provide all of the analog outputs. Circuit cards are configured using hardware jumpers to provide the desired analog formats. Archangel configures the scale factors in software.

## **If we decide to use the AFC strategy, what is the process?**

The list below describes the sequence of events for a complex installation requiring new features in hardware and/or software. For simpler cases, the process is abbreviated.

1. Archangel works with you to define your analog and discrete requirements.
2. Archangel examines existing AFC IP and reports back to you with recommendations.
3. Both parties meet and select a final configuration.
4. Archangel creates a part number for your AFC00X and brings it into Configuration Management per our ISO 9001 Quality System.
5. A prototype is delivered. At this stage, Archangel recommends ground tests just to ensure full signal compatibility with the complete upgrade package.
6. Full production!

# AFC00X Specifications

## Dimensions/Weight

Size	2.625" x 5.25" x 5" (H x W x D)
Weight	2.2 lbs

## Environment/Power

Temperature	-40°C to +70°C operating, -55°C to +125°C non-operating
Altitude	-1,000 to 52,000 ft pressure altitude
Power	16-36 VDC, 0.6 A @ 28 V nominal

## Inputs/Outputs

ARINC 429 Input	From the Archangel AHR150A or AHR75
400 Hz AC Reference Input	Only needed if AC outputs are required
Analog Output Options	DC voltage 2-wire AC (also called 2-wire synchro) 3-wire synchro
Discrete Outputs	configurable
Discrete Inputs	configurable

## Certifications

FAA	TSO C9c for Automatic Flight Controller
Environmental Categories	DO-160E [D2]XABB[UK1] EWFDFSZZXAZZ[Y(QKL)]L[B4K44]XAAX
Software Categories	DO-178C Level B

Qualifications and certifications for TSO C9c, DO-160E ratings, and DO-178C Design Assurance Level (B) are identical across all AFC00X units.

I/O data conversions (quantity and type) are configurable to meet your design.

These are the standard AFC00X specifications. For more than 20 analog channels, Archangel has a larger housing that can accommodate up to 40 analog outputs.

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