ARINC 429/561 Analyser Type 080510

Hardware Information

1. INTRODUCTION

This document sets out details of the hardware of Airflair Limited's 808510 ARINC 429 and ARINC 561 Analyser.

The 080510 connects to a standard PC (which provides the user interface) via a standard USB 1 interface. It provides four ARINC 429 Receiver (Rx) and four Transmitter (Tx) channels. One each of the Tx and Rx channels may also be used for ARINC 561 interface testing. All ARINC 429 channels can be set to read or generate, as appropriate, ARINC 575 compatible data.

The 080510 takes its power entirely from the USB interface which connects it to its Host PC. It is powered whenever the Host PC is powered and the USB cable is connected.

2. PHYSICAL

The 080510 is supplied in two enclosure types, as follows:

A compact aluminium alloy enclosure, ideally suited to field use, measuring approximately 185 x 113 x 30mm.

A 1U high 19" rack mountable module. This in turn may be ordered with connectors located to best suit the application.

In either form the 080510 is provided with two connectors:

A standard `male' 37 way D type connector for the ARINC 429 and 561 inputs and outputs.

A standard USB connector for the link to the Host PC.

3. CONNECTORS AND PIN ALLOCATIONS

USB Connector

The USB connector is an industry standard item, for use wither with the supplied USB cable or with an equivalent cable sourced separately.

ARINC 429/561 Input/Output Connector (37 Way Male D Type)

All ARINC 429 and 561 connections are made via the single 37 way D Type Male signal connector. The pin allocations are as follows:

Pin	Primary Use	Secondary Use	Pin	Primary Use	Secondary Use
1	429 Rx1 Hi				
			20	A429 Rx1 0v	
2	429 Rx1 Lo				
			21	A429 Rx2 Hi	
3	A429 Rx2 0v				
			22	A429 Rx2 Lo	
4	A429 Rx3 Hi				
			23	A429 Rx3 0v	
5	A429 Rx3 Lo				
			24	A429 Rx4 Hi	A 561 Rx Data Hi
6	A429 Rx4 0v				
			25	A429 Rx4 Lo	A561 Rx Data Lo
7	A561 Rx Clk Hi				
			26	A561 Rx Clk Lo (0v)	
8	A561 Rx Sync Hi				
			27	A561 Rx Sync Lo (0v)	
9	0V (Unallocated)				
			28	0V (Unallocated)	
10	0V (Unallocated)				
			29	A561 Tx Data Lo (0V)	
11	A561 Tx Data Hi				
			30	A561 Tx Sync Lo (0V)	
12	A561 Tx Sync Hi				
			31	A561 Tx Clk Lo (0v)	
13	A561 Tx Clk Hi				
			32	A429 Tx4 Lo	
14	A429 Tx4 0v				
			33	A429 Tx4 Hi	
15	A429 Tx3 Lo				
			34	A429 Tx3 0v	
16	A429 Tx3 Hi				
			35	A429 Tx2Lo	
17	A429 Tx2 0v				
			36	A429 Tx2 Hi	
18	A429 Tx1 Lo				
			37	A429 Tx1 0v	
19	A429 Tx1 Hi				

Note that ARINC 429 Rx4 shares connector pins with ARINC 561 Rx Data. This is not a problem, in that the front end receiver circuitry is shared between these two signals anyway. Note also that the `0v' of the single ended ARINC 561 Data signal should be connected to the pin otherwise used for the `Rx Lo' ARINC 429 Rx 4 connection.

4. ARINC 429 AND ARINC 561

ARINC 429 Rx4 and Tx4 may alternatively be used for ARINC 561 purposes. It is possible to use one of these interfaces for ARINC 429 and one for ARINC 561, giving maximum versatility to the arrangement.

The way in which the interface type is selected is somewhat different between the Rx and Tx channels. The arrangements are described below.

Rx 4 ARINC 429/561 Selection

In hardware, the mode selection between ARINC 429 and ARINC 561 is automatic, depending on the input signals connected to the unit. Normally, the 080510 handles Rx4 as an ARINC 429 channel. As soon as it detects the presence of an ARINC 561 clock, though, it switches into ARINC 561 mode – and will remain in that mode for the remainder of that test run.

Keep in mind that for completely satisfactory ARINC 561 operation on Rx4 you will also need to call the function AF_A429RxMode in the .DLL, to ensure that the received data is correctly processed.

Tx 4 ARINC 429/561 Selection

In hardware, there is no need to select ARINC 429 or ARINC 561 explicitly. Since separate output pins are provided for all the required signals both interfaces can operate simultaneously. Please note the following, however:

There is no `Hi Speed' mode for ARINC 561, so the shaped edges of the signals will always be those related to Lo speed operation. As a result, the signals will never have time to reach their correct amplitudes.

If Tx4 is set in ARINC 429 mode (either as a result of this being the default condition or by using the AF_A429TxMode function of the .DLL) then the ARINC 561 outputs will be set to a nominal `0' – although slight traces of the signal may still be apparent.

5. Tx AMPLITUDE SETTING

All Tx outputs may be set to user controlled amplitudes. The arrangements are quite versatile - but as a result quite complicated. They are:

Each of the five output channels (4 x A429 + 1 x A561) has a three way link block. These allow the channels to take their reference, which sets the output amplitude, from either the +5v supply rail (which gives `standard' output amplitudes - ±10 volts on A429 and +12 volts on A561) or from one of two DACs built in to the on-board microprocessor.. The two DAC outputs are amplified such that full scale again represents `standard' output conditions.

The API gives access to the DAC settings, which in turn gives control over whichever channels are connected to the DAC outputs.

It is necessary limit the lower end of the DAC range when it is controlling the ARINC561 amplitude - because the driver design will not in theory tolerate settings of below 60% (equivalent to 7.2 volts). The lower limit of the ARINC 429 outputs is (theoretically) zero – although here too the signal collapses once set to much below 50% of nominal.

The relationship between the reference voltages (from the +5 volt supply or the DACs) and the Tx channels is set using five (3 way) jumper blocks. These are shown in the figure below.

Tx Amplitude Setting Jumpers
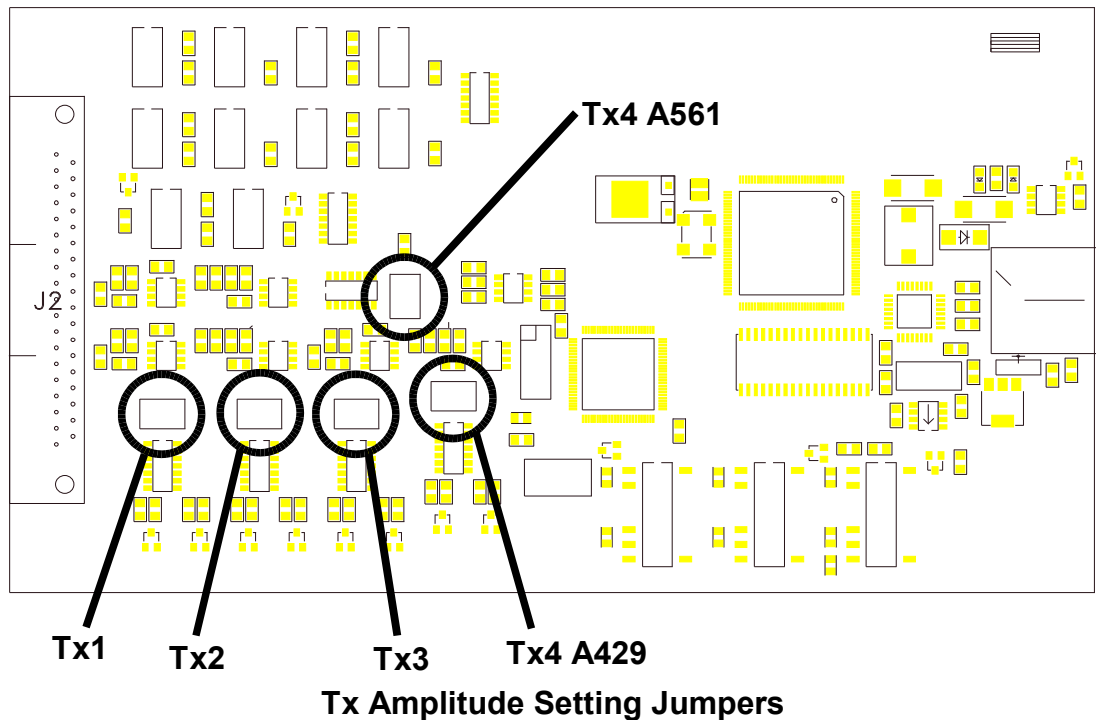
The jumper blocks each have legends next to them, which relate to the voltage reference sources as follows:

VREF1 = DAC0

5 = +5 volt supply

VREF2 = DAC1

The units are shipped with the following jumper settings:

A429 Tx1   Connected to DAC0 (VREF1)

A429 Tx2   Connected to DAC0 (VREF1)

A429 Tx3   Connected to DAC0 (VREF1)

A429   Connected to DAC1 VREF2) , range limited to 60 => 100% (option for +5 only, do not use the `VREF1 position)

A561, Connected to +5v. Do not use the VREF1 position

The factory set jumper positions should be adequate for most purposes. By default, the DAC outputs are set to give standard (±10 volts on A429 and +12 volts on A561) output amplitudes. If you do need to get access to the jumpers, proceed as follows:

Ease off the bezel surround from the end with the 37 way (signal) connector

Remove the four screws.

Pull gently on the end plate to slide out the circuit board far enough to allow access to the jumper(s) you wish to change

Slide the board/end plate back to its original position

Refit the screws (being careful not to over-tighten them) and the bezel surround.