

ARINC 429 Arduino Shield

Description

This shield is an ARINC 429 interface for Arduino. The circuit features two ARINC 429 inputs and one ARINC 429 output along with additional multi-purpose inputs / outputs.

The shield may be plugged onto Arduino Uno or Nucleo boards and provides a 26 pins HE-10 connector to the external world. The HE-10 connector enables the use of a SUB-D25 plug if wanted.

A [Gaia MGD-04](#) 28V -> 5V DC-DC power converter may be soldered by the user if necessary. The converter is then able to power the shield and the Arduino board. Otherwise, the shield is powered by Arduino.

The board may be used as a protocol converter, bridge (2xA429 -> A429, RS422 <-> A429 etc...), test bench, PC interface with aeronautical equipment etc.



Features

The shield uses an ARINC 429 transceiver chip (HI-3593 from Holt, [product page here](#)) clocked at 16 Mhz. The communication with the Arduino board is done by SPI.

ARINC 429

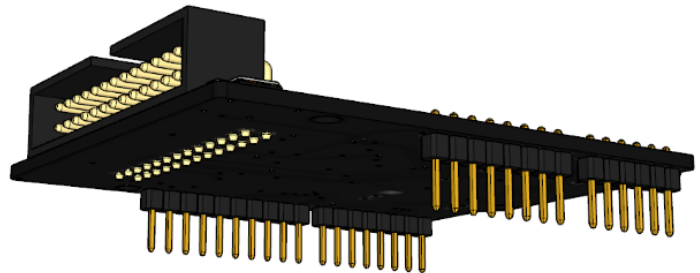
- 2 inputs: high speed or low speed
- 1 output: high speed or low speed

RS422

One full duplex RS422 line interface (MAX488)

Multipurpose I/O

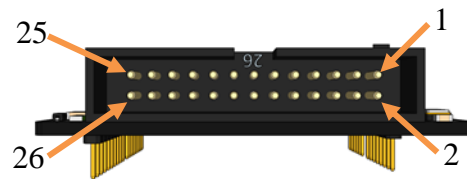
4 analog inputs - 2 digital inputs - 1 digital output



Board Connections

The pinout of the HE-10 connector (26 pins) is as following:

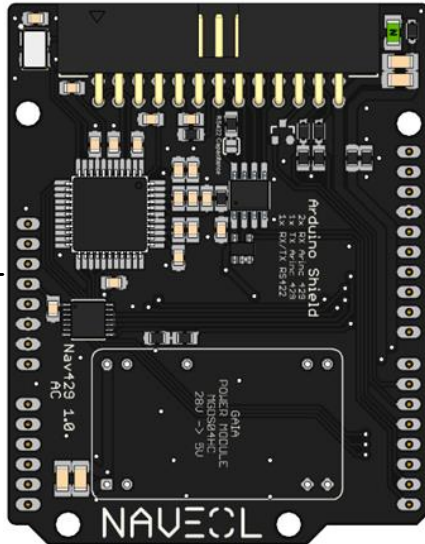
HE10	SUB25			SUB25	HE10
1	1	A429 RX1 H	A429 RX1 GND	14	2
3	2	A429 RX1 L	A429 RX2 H	15	4
5	3	A429 RX2 GND	A429 RX2 L	16	6
7	4	A429 TX H	A429 TX GND	17	8
9	5	A429 TX L	RS422 TX H	18	10
11	6	RS422 TX GND	RS422 TX L	19	12
13	7	RS422 RX H	RS422 RX GND	20	14
15	8	RS422 RX L	AIN1	21	16
17	9	AIN2	AIN3	22	18
19	10	AIN4	GND	23	20
21	11	0V/OPEN OUT	0V/OPEN IN1	24	22
23	12	0V/OPEN IN2	28V (+)	25	24
25	13	28V (-)	GND	-	26



Notes:

- A429 RX : ARINC 429 receive port
- A429 TX : ARINC 429 transmit port
- RS422 RX : RS422 receive port
- RS422 TX : RS422 transmit port
- H : hot point
- C : cold point
- AIN: analog input port (10 bits, 0V to 5V)
- 0V/OPEN IN: digital input (0 to 28V)
- 0V/OPEN OUT: digital output, open drain (28V)
- 28V (+) and 28V (-): main power supply
- GND : ground

Shield Nav429	Arduino UNO
NC	Reserved
IOREF	IOREF
NC	RESET
3.3V	3V3
5V	5V
GND	GND
GND	GND
NC	VIN
NC	A0
NC	A1
AIN1	A2
AIN2	A3
AIN3	A4
AIN4	A5



Shield Nav429	Arduino UNO
NC	SCL
NC	SDA
NC	AREF
GND	GND
HI-3593 - SCK	SPI clock (13)
HI-3593 - MISO	SPI MISO (12)
HI-3593 - MOSI	SPI MOSI (11)
HI-3593 - CS	10
HI-3593 - OE	9
HI-3593 - MR	8
HI-3593 - TEMPTY	7
DIN1	6
DIN2	5
DOUT0	4
HI-3593 - R1INT	3
HI-3593 - R2INT	2
RTOUT (RS485 TX)	TX (1)
RRIN (RS485 RX)	RX (0)

NAVEOL Nav429 1.0 Arduino Shield interface

Notes:

- The output « 0V/OPEN Out » is connected to a MOSFET open drain. The associated gate is “DOUT0” (with inverted logics).
- The 2 digital inputs DIN1 and DIN2 are tied to IOREF through 2.2k resistors and schottky diodes.
- The RS-485 RX (0) pin is “ORed” with the bootloader UART RX of the Arduino.

References and documentation:

- The pinout of the Arduino Uno board can be found [here](#).
- The datasheet of the Holt HI-3593 can be found [here](#).
- The Gaïa DC-DC converter can be found [here](#).
- Free software for Arduino Uno and Nucleo board is available, please contact NAVEOL.
 - o Library (*.cpp, *.h)
 - o Autotest firmware